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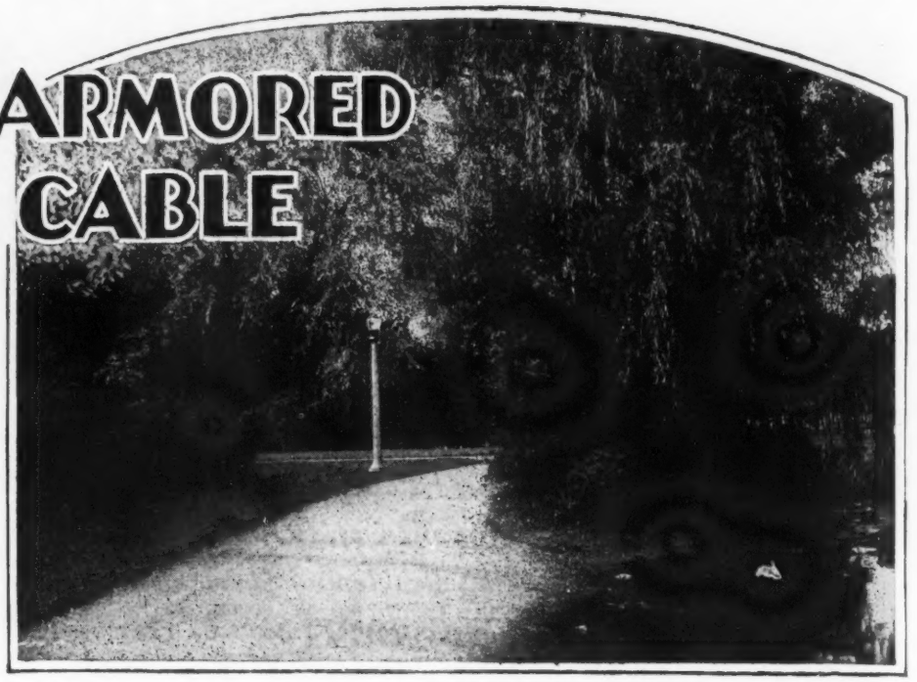

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Impressions Carried Away from a Notable Convention

THE feature of the National Electric Light Association in Atlantic City this week was the tribute to Mr. Edison. The ten thousand light and power men and women there assembled paid grateful respects to the founder of their industry. His work was praised in notable addresses; marvelous lighting effects celebrated his inventions; the talking motion pictures conveyed felicitations from notable men in foreign lands. Statesmen, executives, brother pioneers, artists, authors, playwrights, engineers and scientists joined with the rank and file of the industry to give expression to their deep appreciation of the human qualities and revolutionary contributions of this great American character. The occasion drew the people of the industry closer together; it gave them a perspective in which to view their work; it rededicated them to the cause of public service, and it made them proud that they were part of an industry conceived by the master inventor only fifty years ago and now grown to be a main factor in the social and industrial standards of modern civilization as it exists in America.

The program was replete with addresses on other topics connected with the industry. Leaders touched upon its progress; they discussed industry problems; they announced public relations policies with sincerity and conviction—each aspect of this large and important industry had its meed of attention. And what things stand out?

FIRST was the announcement of the necessity for building more and better business, especially domestic business. With logic based upon well-established facts, M. S. Sloan showed that unless domestic business shall be increased the financial integrity of the industry may be jeopardized in a few years and its public relations injured. He issued a resounding call for action to change whatever trends may exist boding ill health to the industry. He urged complete electric service for the homes of the people and declared that inducement rates, a sales program and an adequate sales staff are necessary tools for the task. Other speakers agreed with Mr. Sloan and pointed out the market opportunities and the public service obligations connected with amplified domestic service. The side-show stage has passed in domestic load building.

Another impression comes from a study of the attitude of the public toward the industry. The situation today is one wherein there exist splendid local public relations in each service territory, notwithstanding which, however, a certain "bear-baiting" attitude toward the utilities as a national industry is cherished. This attitude toward the industry as a national unit has so far wrought it no harm, but it is a hovering cloud that might send storms in the form of unfriendly national legislation if guided by malcontents toward a definite objective. To change this condition is difficult. There is a mist to dissipate. It cannot face the sunlight of facts, but a sure way of getting the public to understand these facts is still to be found. They must gain a hearing and that quickly. This is the public relation's problem of the industry today.

OTHER addresses at the convention gave an impression that the industry is gaining rapidly in business efficiency. Leaders dwelt on ways to manage departments in a utility organization. It was evident that more thought and planning are being brought to bear on the assembly of men, money and apparatus on which the business rests. The results of this attitude will be manifest in reduced investments, increased sales and a better operating ratio. The "Topsy" era is over. Sound economics and efficiency will rule in the future.

Still other impressions were made by the splendid program. Sound policies were reiterated and new policies were announced. An independent press was declared to be essential to free government, and a strong stand was taken for the maintenance of private initiative and enterprise and state regulation. The leaders announced that they would continue their program of giving to the public the facts about their business. Rural service will be extended and customer-ownership policies continued. Interconnections will be made and systems will be consolidated whenever economic advantages may be thereby gained in the interest of better or cheaper service. A constructive program for development through unstinted support of scientific research was announced. All policies that have proved themselves sound will be continued and expanded. There was a spirit of courage and confidence in the air that speaks well for the future.

Economic Slant to Utility Engineering

FOR two or three years the engineers of the light and power industry have approached their problems with an economic point of view. They are working for "more capacity per dollar of system investment," as they state it. That their work is excellent is borne out by the stationary and even decreased operating ratios and by the great improvement in the efficiency of the equipment used in utility service.

But engineers are prone to keep trying to improve—they cannot stand still—and at the recent Atlantic City meeting three notable talks by Messrs. Elden, Marshall and Stone told of the basic scope of the work they are now pressing to decision.

They are anxious for a greater use of standardization in the industry. They state the desirability of standardization in dollar values and are working early and late to get standardization on voltages, on circuit breakers, on arresters, on ratings and other items whereby standardization will produce savings to the industry. Nor need one fear that standardization means stagnation—the past proves that progress will continue.

A second goal of the engineers is to work toward the most serviceable and economical system by the use of a greater amount of analysis and planning. They are striving to plan their assembled property more carefully and to fit apparatus together that both serves the present demands and anticipates the future needs. This project is of fundamental economic importance.

And, finally, the engineers are trying to get more capacity out of the existing investment. They are tying together loads and stations to keep generators loaded and system reserve apparatus to a minimum. They are cooperating with commercial men to get high-load-factor business on the system. They are modernizing their operating and maintenance practices and are choosing equipment in the light of past records of performance.

It is a splendid tribute to the engineers that the systems they have built operate so well—the rate of growth in load and the changes in the art are well known—but it is a still greater merit that they are found striking at economic trends that presage damage to the industry if unchanged. There is no doubt that their efforts are needed nor that their work will contribute very greatly to industry welfare.

* * * *

Broader Accounting Service Ahead

ILLUMINATING comment by W. A. Jones in Atlantic City upon the increasing opportunities before the accountant struck a responsive chord. It is no news that the duties of the accountant have been widening and deepening for some years in the electrical industry, but today the professional character of his work in forward-looking companies is more marked than ever before. We are in a transition stage from the days of small-scale production and distribution to an era of huge operations in which co-operation plays a vital part. The accountant's contribution to the solution of important problems of administration is becoming of major consequence.

Company development has for decades been based upon records, but now the science of interpretation is being called upon in many properties as a new tool with which to cut away the underbrush of uncertainty from the path of progress. Mr. Jones did well to bring out this function of the accountant in contrast with his earlier duties as a bookkeeper. Executives are far more concerned today with forecasting than with water which has run over the arithmetical dam. The accountant is in the best position in history to contribute to the making of high-speed business developments; he is increasingly responsible for the preparation of adequate data in connection with investigations and regulation, and will be more so in future.

The accounting aspects of interconnection are becoming interesting and significant. Here the accountant and the engineer must work together with skill and understanding, in order that proper cost allocations may be made and sound decisions reached as to construction and operating policies. Acute competition is a feature of the industrial power and heating field, and the accountant is needed in many situations involving careful determinations of costs and of proposed contract terms. The power sales engineer is likely to utilize the methods of the skilled accountant more and more as time goes on, and this should be accomplished through closer team play between such specialists. In rate design, economic load building, financing, and in the quantitative interpretation of power company activities to the public, the counsel of the accountant is constantly growing more valuable, and it is cause for congratulation that a branch of the power industry once looked upon as dull in interest and narrow in outlook has made such fine progress toward ripened usefulness. It is indeed an indispensable element in modern personnel organization.

* * * *

Illumination at Its Best

FIRST impressions of the N.E.L.A. convention were of light—light and more light. This refers to Atlantic City as a whole and more specifically to the convention hall. It was to be expected that Atlantic City, which was always known as a city of light, would outdo itself in this year of honor to Thomas Edison. But there is something more significant in this impression than merely light. There are two outstanding features in the illumination which deserve serious thought and which are full of hope for the electric utilities.

The first is the impression that the resistance to more wattage in illumination is breaking down, that people are beginning to realize that the electric bill should not be considered as an item by itself and merely compared with last year's bill, but that the lighting bill must be considered as a part of the total cost of building maintenance, construction cost, decorative effects or advertising value. When considered as such—and lighting salesmen should impress this view on customers on every conceivable occasion—the lighting bill is not very great, no matter how much higher it may be than last year, if the results obtained take their true place in the total picture.

The second significant feature is the high quality and artistic execution of the lighting scheme. Gone are the days of the old-time boardwalk or building illumination when a contractor merely hung so-called stringers at any place he happened to be able to attach them, using lamps of any color which he happened to have in stock. The Atlantic City illumination gives at once the impression of having been carefully planned by illumination specialists co-operating with architects, artists and engineers. The golden clusters on the Boardwalk lamp posts are good examples of what can be accomplished.

The Hotel Traymore, whose lobby has been known as a classic example of excellent co-operation between architect and illuminating engineer, again shows a remarkable exhibition of building-top floodlighting. Floodlighting in general does not appear natural for building tops, because the architecture is always so designed as to be illuminated in the daytime by light diverted downward, whereas floodlighting is diverted upward. The Traymore is one of the first examples of correct building-top floodlighting. The impression is not of floodlighting at all, but of translucent roof, illuminated from the inside. Credit is due those who conceived and very successfully executed the idea. It is a landmark in building floodlighting, and there should be more like it.

The most outstanding feature of Atlantic City illumination is the general lighting of the new auditorium. By this is meant not the ever-freakish color-mixing scheme, but the general scheme of illumination. How the illuminating engineer succeeded in persuading the architect to dispense with all gingerbread chandeliers in such a huge auditorium is almost beyond understanding. But it was done, and the results are so excellent that the installation deserves to be studied and restudied by every illuminating man and architect. There are a total of 540 1,000-watt lamps, all recessed in the sides of the huge arched beams, and the whole arched ceiling is aluminum-painted. That is all—no fixtures, no bronze or plaster or tin chandeliers. The result is not only correct lighting, but artistic lighting.

* * * *

A Forester Views with Alarm

ENCOURAGINGLY recurrent protests of many interests in regard to the depletion of our timber lands must ultimately have some effect upon prodigal, spendthrift America. J. R. Simmons, forester, New York State Forestry Association, is the most recent protestant against present practices. "I wonder," he asks in a statement issued by the New York State Educational Department, "whether America will come eventually to the fagot-gathering stage. We are cutting about five times as much timber annually as is being grown in this country, and the center of lumber production has shifted from New York State to the Pacific Coast within the memory of persons now living. We have reduced our forest wealth by two-thirds within a century, while our population has increased twelvefold."

Suggestions for remedial measures must be practical ones, and therefore the situation permits of but a single alternative—either to cease lumbering operations or to reforest on an adequate scale. A more enlightened age will reflect with more sorrow than amusement, one may be sure, upon a civilization which blindly destroyed virgin timber lands without adequate provision for the future while the treeless plains of a deforested China lay as tragic evidence of thoughtless profligacy.

Our boast of an economic era must bear the vituperation of posterity, for the cost of timbering, sawing, marketing and delivery is not the cost of production. The well-known principle of reproduction cost is nowhere more applicable. The cost of a thousand board-feet of lumber or of a pole must ultimately include the cost of replacing that which has been destroyed. Labor, land, equipment and time are all unavoidable factors. Natural resources are not the unquestionable property of him who by one means or another acquires title to the land.

The Compass That Is Needed

ANY study of certain business aspects of the light and power industry gives cause for serious concern about its future prosperity. Both A. C. Marshall and M. S. Sloan called attention to this situation in two outstanding papers at the Atlantic City convention. There is no reason for alarm at present, but these trends to financial ill health must be corrected.

The facts to be faced are, first, that the total capital investment per dollar of earnings has increased materially in the past few years and promises to increase in the future, and, second, that the ratio of direct operating expense to gross earnings is about stationary. Nor is there promise of improving this ratio appreciably. Stated in another way, there is a decline in the energy sales and revenue per unit of capital investment and the capital investment is increasing per unit of system capacity. These facts should be studied because upon them rest the foundation stones of a sound utility structure.

It is true that engineering and managerial efficiency have held earnings nearly normal, but the possibility of maintaining this record is not logical, for scientific business men especially, in the face of what might be called an industry policy of rate reduction. It is evident, therefore, that sooner or later trends in sales and investment values will react upon the financial condition of industry.

How can these trends be offset? The solution suggested by Mr. Marshall is designed to decrease both the investment values and the operating ratio. It lies in the development of what might be called a master co-ordinated system plan where each function and each piece of equipment would be established on the basis of a thoughtful analysis of facts and trends based upon both present conditions and future expectations. In the opinion of this student of the industry, a comprehensive program of system planning would make for a different condition in five years' time. A master plan includes sales as well as other elements and is difficult to develop and to apply quickly and definitely to get more and better capacity per dollar of cost. It is a basic program and a fundamental procedure, but must be built up of complete elements.

The remedy suggested by Mr. Sloan is to increase sales, especially domestic sales, because this is a fruitful field and is a permanent type of load that should improve load factor. Moreover, Mr. Sloan rightly thinks it is a worth-while public service to have complete service in the homes. He advocates an inducement form of rate and aggressive selling as the way to offset the trends that threaten to destroy the prosperity of the industry.

Other thoughts on ways and means to offset unsatisfactory tendencies should include taking advantage of the economies that may be brought about by consolidation and interconnection of systems, the careful scrutiny of practices in purchasing property and in utility financing, the establishment of researches in engineering to develop better and cheaper ways of doing things, and a slower acceptance of rate reductions as being a necessary part of every adjustment of rate schedules for the purpose of obtaining inducement rates.

There is no one key to the prosperity safe. Intelligent management is needed, and this is made up of sales, engineering, business, accounting and all other elements of the complicated utility business. What are needed are a realization that present trends are unhealthy and a definite program on each property to set them right. These things should be done now, for the task is one that will take five or more years.

M. S. SLOAN
President of the New York Edison Company

President-Elect National Electric Light Association

The Fifty-second Convention

OF THE N.E.L.A.

Pays an Industry Tribute to

Thomas A. Edison

Addresses, jubilee lights and talking motion pictures attract ten thousand visitors to Atlantic City. Business building accented. A résumé of happenings at the meetings

TEN THOUSAND men and women of the light and power industry attended the fifty-second convention of the National Electric Light Association in Atlantic City this week. This meeting departed from others in many respects, but chiefly because of the tribute paid Thomas A. Edison, the founder of the industry. From the start to the glorious climax on Edison Day the men and women of the industry voiced recognition of the genius of the great inventor. Even the physical surroundings paid tribute. The marvelous auditorium was filled with exhibits, the buildings and the Boardwalk of Atlantic City glowed with jubilee colors—all were part of the industry's celebration in honor of its founder.

In perspective the wonderful week had so many new, instructive and admiration-provoking features that it would seem as if the industry could never reach such a climax again. The "Light's Golden Jubilee" effects on the hotels and along the Boardwalk made Atlantic City a fairyland. The dedication of the new auditorium, the auditorium itself—that masterpiece of civic accomplishment—the Edison Day celebration, the magnificent public policy meeting, the splendid addresses, the talking motion pictures, the entertainment and social features—all added their full quota to the instruction and enjoyment of those attending the meetings.

"Talking movies" shown this week were taken in other countries during the last month expressly for showing at this convention. Those whose personality and voice were brought before the gathering for a few minutes each, one at each session, in honor of the occasion were Dr. Alberto Pirelli of Milan, Italy, president of the International Chamber of Commerce; Sir Ernest Benn of London, economist and publicist, and Sir Kengo Mori of Tokyo,

chairman of the Japanese delegation to the Reparations Conference in Paris. Mr. Edison being still in Florida, and therefore unable to attend the convention, was seen and heard in another film, extending greetings and words of encouragement to those in the electrical industry.

First General Session

In opening the first session on Tuesday, President Preston S. Arkwright struck the keynote of the convention when he urged that all in the electric light and power

H. N. McConnell, S. Z. Mitchell, and H. H. Adams

industry accept Mr. Edison's example of patience, persistence and whole-hearted devotion to an idea as the ideal of what the industry should strive for in its dealings with the public. He urged even greater co-operation toward the solution of common problems than there has been in the past, to the end that the United States may continue to lead the world in the production and use of electrical energy.

Mr. Arkwright urged tolerance, but firmness of purpose, in dealing with critics; careful introspection as to motives and methods of development, and then aggressive progression along lines determined to be right and for the best interests of the public and the investors in the industry, and concentration of effort of the best minds of the industry in solving some of the present problems confronting it, followed by united expenditure of energy in carrying out decisions reached.

The present financial condition of the association was discussed by Treasurer P. S. Young. The new feature of this association work is the development of a research program on a scale that is a credit to the industry.

Referring to the year's progress in the electrical industry, Paul S. Clapp, managing director of the association, said that energy used in the home has increased 15 per cent. More than a million new users were enrolled during the year. There has been an increase of 7 per cent during the period in the energy consumed by the average user, Mr. Clapp asserted, but incidentally the average amount paid has increased only 3 per cent.

With regard to the Federal Trade Commission investigation, Mr. Clapp said:

"During the year the National Electric Light Association has been under intensive federal investigation. In accordance with the policy indicated by the officers of the association, our attitude has been one of complete co-operation with the government. Various representatives of the Federal Trade Commission have made repeated visits of varying lengths to our headquarters offices. All accounts reaching back ten years have been scrutinized in detail several times. Each voucher has been critically reviewed. Indices of the complete files were furnished and investigators were given prompt and complete access to every file requested. Requests for specific information and voluminous copies of material were complied with. Members of the staff have testified in Washington frankly, completely and often."

The question of whether or not adequate attention has been paid to the rate situation in relation to that devoted to technical improvements was raised by William L. Ransom, public utility counsel. He referred to one very favorable sign—the growing public interest in and understanding of rate problems and the constructive suggestions being made by customers.

Unusual interest was shown in the "talking movie" address by Sir Ernest Benn. The speaker discussed the theoretical and practical superiority of private ownership.

Good Public Relations Must Be Earned

That public relations deserve as much attention as turbines and generators was emphasized by J. F. Owens in "giving account of his stewardship" as chairman of the Public Relations National Section. Mr. Owens presented a forceful argument in contending that to gain public confidence the public utilities must earn and deserve such confidence. "It doesn't come by chance."

On the ground that the customer buys primarily light, heat and hot coffee rather than kilowatts, A. W. Robertson, chairman Westinghouse Electric & Manufacturing Company, presented a most convincing argument to establish that it is the duty of the utility to see that he gets it. The response of the customer, Mr. Robertson said, is commensurate with the service he receives in terms of what he wants. "We should stimulate architects and builders to put into new homes and apartments only standard, high-grade appliances. Encourage in every way possible the use of right appliances as against unreliable devices, which, if they should fail, bring down upon the heads of manufacturer, public utility and all of us criticism difficult to answer." Mr. Robertson pointed out that where service is bad the consumer quickly joins the forces of the critics of the utilities.

W. S. Barstow, C. L. Edgar, and Martin J. Insull

Tributes to Edison Inspire Hearers

"Triumph has been realized over drudgery, . . . and the industry owes him an everlasting debt of gratitude."—JOHN W. LIEB.

"It remained for Edison to discover the source from which at his magic touch was created a new sun for a new world . . . Edison conquered the apparently unattainable by dint of hard work, untiring zeal and unlimited perseverance . . . He has blazed a trail through unknown wilds while others looked on with unbelief. . . . Personally, I feel like bowing my head and being thankful that my good fortune has enabled me to live my life in the atmosphere he has created and under the inspiration of his name."—CHARLES L. EDGAR.

"The multiple-arc system of distribution is one of the outstanding achievements of history."—E. W. RICE, JR.

"The whole economic structure and mechanism of today can be said to hang by the single burnt thread which first successfully glowed in the vacuum Edison himself had created. Out of that vacuum and the charred thread of the incandescent light has come ten billion dollars of new wealth."—BERTON BRALEY.

Second General Session

Taking as his subject "Sale Increase or Rate Increase?" Matthew S. Sloan, president of the New York Edison Company and first vice-president of N.E.L.A., in an outstanding address before the second general session of the convention on Wednesday said forcibly that the light and power industry "is slowly being squeezed

Edwin A. Barrows, Morse Dell Plain, John G. Learned, and H. P. Liversidge

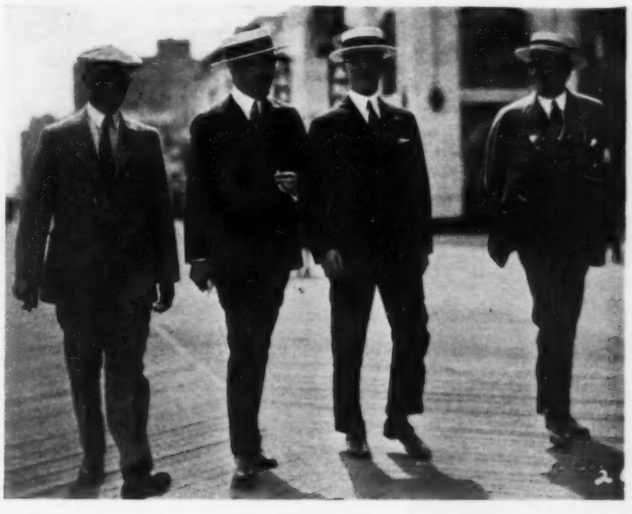
between the jaws of a pair of pincers." One jaw is a decline in the kilowatt-hour sales and in revenue for each dollar of investment, and the other is a rising investment for each kilowatt of installed generating capacity.

Summarizing the situation, Mr. Sloan asked the question: "Shall we increase our sales or our rates?" "The answer to this question is," he said, "that we must increase our sales. We must sell more kilowatt-hours for each dollar of investment, making our equipment work harder and steadier, and the place to sell more service, in my judgment, is in the home."

He gave figures showing the average consumption of electricity in the nineteen million homes now receiving service and gave a number of reasons why domestic sales should be vigorously stimulated, including the fact that "the customer who makes the largest use of service is, in all human probability, the best satisfied customer."

The investment companies were championed by Marshall E. Sampsell, chairman of the Commercial Section, who said that without their assistance by the purchase of common stock and by the extension of general credit, as well as by management and engineering skill, many operating light and power companies could not keep pace with their rapidly expanding business.

"To protect investments made in transmission lines interconnecting smaller communities and extending into



W. R. Power, P. S. Arkwright, C. E. Groesbeck, and C. P. Billings

rural districts where there exists little industrial activity," he said, "requires a larger volume of electric service in small-town homes and on the farm. Successfully to meet these obligations we must sell more kilowatt-hours through intensive development of new markets that will improve the load factor. In this undertaking we are forced to meet keen, well-organized competition from other industries, equally anxious to grow and prosper."

According to Mr. Sampsell, "Rate structures are not sufficiently conducive to broad promotion of electricity and their form is not calculated to encourage the most liberal use of energy, which must result in a lower average rate to the consumer."

Reporting on the electrification of railroads, Britton I. Budd, chairman of the committee on that subject, stated that there are twenty railroads having some degree of electric operation. The length of route electrified is 1,900 miles, and that of all tracks, including yard and side tracks, 4,300 miles. The three large electrifications now under way are the Pennsylvania, the Reading and the Lackawanna.

George Gibbs, consulting engineer, of New York, followed Mr. Budd. After reviewing the history of railroad electrification in this country, the progressive steps which are being taken by various railroads to develop heavy electric traction for all kinds of traffic, and the advantages now being secured by some roads by electri-

fication in freight yards for shunting and classification purposes, he said:

"Electric haulage has been tried out for every condition met with on steam railways. It has demonstrated by years of trial that the present development and perfection of apparatus from the power house down to the propelling wheels of the train will produce reliable and useful results from an operating standpoint."

E. C. Stone, chairman of the Engineering National Section, reporting on the activities of the section, urged "more system capacity per dollar of investment." With fuel efficiency at its present high level the cost of generation has become almost a minor item, he said. Discussing the question of electrical hazards in the home, Mr. Stone said that considerable public attention had been called to them, probably because "while such accidents are very few, they are necessarily spectacular in nature when they do occur. Recent statistics of the National Safety Council indicate that the chance of a fatal accident in a home from a fall is sixteen times that from electricity."

P. B. Zimmerman, secretary of the National Food Preservation Council, spoke on the food preservation program. This program has for its objective four major ideas. These are the necessity for keeping food below a certain temperature, the relationship between food spoilage and health, the causes of food decay and bacteria growth, and the vital need for proper all-year-round refrigeration.

Sparkling jewels draped between color-toned columns on the Boardwalk

General J. J. Carty, vice-president of the American Telephone & Telegraph Company, addressed the session on "Science and Progress in the Industries." He pointed out that American progress was linked with research and said that "one of the outstanding factors in the success of the light and power industry is its encouragement and support of laboratories for research in applied science."

Third General Session

Thomas A. Edison delivered a personal message to a throng that jammed every available inch of space in the mammoth ballroom of the auditorium on Thursday at the third general session. This was set aside on the program as Edison Day. Mr. Edison appeared through the medium of a "movietone" film, which pictured him as strong, active and smiling, and which transmitted his message in a voice firm and clear to those gathered in convention to do honor to the founder of the electrical industry. Mr. Edison said in part:

"When I invented the incandescent lamp I realized that the lamp alone was not enough. It was necessary also to perfect a system of electric generation and distribution. I immediately set about to develop it, and it makes me happy to know that the system as well as the lamp still persists in all its essentials.

"I had in those days a high opinion of my invention. All inventors have. But I must confess that I never dreamed that from it would come the stupendous electrical industry of today.

"Naturally, I am gratified to feel that I have been privileged to play a part in this vast achievement. I am proud of the electrical industry—of its vision, courage, zeal and devotion to public service, and I suspect every American feels the same way about it."

Designating him as New Jersey's most illustrious citizen, Thomas N. McCarter, president Public Service Electric & Gas Company, paid a remarkable tribute to Mr. Edison. After listing a few of the many major industries in which his inventions have played an important part, such as telegraphy, telephony, wireless, radio, motion pictures, electric rail transportation and electric light and power, he said:

"We of the electric light and power industry owe to Mr. Edison much more than is involved in the discovery of a practical incandescent lamp, important as that discovery was. In my opinion we owe to him the very basis of our industry. He gave to us the first practical commercial central station, and he developed for us the first practical method of generating and distributing electrical energy. From the abstract he produced the concrete; from theory he educed practice; by the magic of his mentality he converted scientific speculation into practical accomplishment, and upon the foundation that he laid has been reared the great structure of an industry that today plays so great a part in the economic and social life of this nation."

Taking as his subject "Inspiration of a Name," Charles L. Edgar, president of the Edison Electric Illuminating Company of Boston and one of the early associates of Mr. Edison, told the audience that the illustrious personages whose names have illuminated the pages of history can be classified into two separate and distinct groups. In the first group he placed such names as Washington and Lincoln—men who have dedicated themselves to the preservation and upbuilding of their country. In the second group he placed those "who have risen to fame through accomplishments which were the result of a thought or an idea originating in their inner consciousness." These he said were "pure individualists who assumed their tasks, not in response to a popular demand for a leader to accomplish some desired result, but inspired only by their own visions."

Turning to Mr. Edison as the outstanding personage of this second group, Mr. Edgar said: "It remained for Edison to discover the source from which at his magic touch was created a new sun for a new world, dispelling darkness and bringing added comfort into the homes and revolutionizing the life and methods of a

grateful world. For him nature revealed her hidden secrets, and through him a new industry sprang into being. After centuries of unconscious waiting the world awoke to realize that the dark watches of the night had wasted away and a new day dawned."

Another feature of the program was the presence of Elmer A. Sperry, president of the American Society of Mechanical Engineers, who presided at the first convention of the National Electric Light Association in 1885. Mr. Sperry spoke on "The Birth of the Industry," describing the organization of the association, the many difficulties of the industry during its early days, and the arc light, which was the only form of electric lighting prior to the invention of a practical incandescent lamp and Mr. Edison's system for generating and distributing electricity.

The concluding address of the session, delivered by

Artistic decoration formed with pattern lighting

Berton Braley, the well-known author, can only be described as a classic among efforts to express appreciation of an individual and his work.

Speaking whimsically of the way in which poets, painters and writers bewail the humdrum and monotony of this machine age and how "at last their funeral sermon on romance is read—as it was probably written—under the glow of a lamp whose light is fed by a terrific and intangible power which no man knows, but which man has learned to control and direct" Mr. Braley said: "Today it is the engineer, the scientist, the inventor and the business man who concern themselves with romance, who carry it on as their daily job, and who are too busy making sagas to sing them."

Fourth General Session

One of the outstanding addresses on Friday at the fourth general session was delivered by John L. Madden, vice-president of the Metropolitan Life Insurance Company. The subject was "Industrial Development in the United States," and it dealt with the results of a field survey conducted in co-operation with the civic development committee.

According to Mr. Madden, "the real industrial development came from new industries started within the communities themselves," the migration of industry being relegated to a much smaller rôle in economic growth than was expected. Relocations accounted for only 9.4 per cent of the plants gained by the various communities. New industries accounted for 81.8 per cent of the plants gained, while branch plants accounted for the remainder of 8.8 per cent.

During the period surveyed 5,908 plants were lost to American cities. About 18 per cent of these moved away, while the remaining 82 per cent went out of business. The total number of plants lost was about 60 per cent of plants gained.

Arbitrarily taking a population of 50,000 as a dividing line between larger and smaller cities, Mr. Madden said that "we find that the branches and relocations were divided nearly equally between these two types of cities, but that approximately three-fourths of the local plants were established in the larger cities. All types established in the larger cities accounted for 58.4 per cent of the total gains in employment reported in the survey."

The larger cities of 50,000 population and over received 54 per cent of the plants employing 100 or more workers, whereas the smaller cities received the remaining 46 per cent of these larger plants, more than one-half of which are in cities of less than 10,000 population.

Discussing the reasons underlying the location of plants, Mr. Madden said that "markets are advanced most frequently as the reason for location of plants. The business man," he continued, "who has tuned in his sales practices to the high demand of his consumers is naturally going to consider the location of new plants in relation to his marketing program."

J. F. Ford, chairman of the Accounting National Section, reported on the activities of this section. He dwelt on the effective development of accounting methods and traced the trends that are leading the accountants toward a broad and very fundamental functional position in the industry. The scope of their work calls for a complete business man, and they co-operate with those in charge of all departments.

Sir Kengo Mori of Tokyo, Japan, paid tribute to the genius of Thomas A. Edison and his electric incandescent lamp through a "movietone" film. One thought expressed by him was: "An invention whose advantages can be enjoyed by only one section of the community, or the people of only one country, cannot be termed a true blessing. But the electric lamp is a true blessing in the sense that its beneficence extends to every man, every woman, the world over.

"The cost of producing and distributing electrical energy has been greatly reduced," said William J. Hagenah, vice-president of the Byllesby Engineering & Management Corporation, in his address on "Regulation." The reasons for the lower costs, he explained, have been the remarkable progress made by the electrical industry by the building of vastly larger and more efficient units of production, the greater productivity of labor per unit of effort, the interconnection of utilities and the increased economy of operation and efficiency of management made possible by the holding company and the management company.

George Knutson, Guy Talbot, and Franklin T. Griffith

"The great savings," he continued, "that have resulted from inventions, improvements in technical processes and efficiency in management have been transmitted to the public through the constant downward revision of rates. The profits have not been retained by the utilities, for at no time have the state regulatory commissions permitted rates that yielded an unreasonable return on the fair value of the properties. The influence of the state commissions has always been present, both in formal and informal negotiations, carrying out the spirit of the utility laws. Every saving by the utilities, almost as soon as it was accomplished, has been passed on through lower rates to the customers for service. During this same period private industry, limited only by the restraints of competitive business, not only advanced prices violently, but has generally maintained them at a level far in excess of pre-war prices."

Another speaker at this meeting was J. R. Howard, past-president American Farm Bureau Federation, who dwelt on the progress and problems of rural electrification. He urged progress and pointed out the national importance of this work. B. F. Weadock, special counsel, reported on his work with the Federal Trade Commission, and W. H. Oken, Jr., senior editor ELECTRICAL WORLD, presented the memorial address.

The Night of Nights

Always at an N.E.L.A. convention there is a night that marks a climax. This is the evening devoted to the public policy program. It may well be said that the flower of the light and power industry convened in the great ballroom of the auditorium on Thursday night. More than five thousand utility men and women dressed in their best were framed in a setting made possible by the most marvelous auditorium in the world. The inspiring report of the public policy committee contained the fundamental doctrines that have made the industry and laid the planks of its future platform. The able address of Julius H. Barnes, chairman of the board of the United States Chamber of Commerce, gave a picture of all industry and oriented the light and power group in the perspective possible only to a man with the vision and experience of Mr. Barnes.

Add to this the public honor paid the El Paso Electric Company for notable achievement. President Arkwright publicly bore witness, through the Coffin award to the company, that the light and power industry has ideals and goals transcending purely business and mercenary considerations.

But not all was oratory or honor to worthy members. In the gorgeous setting artists of world renown added greatly to the pleasure of the audience. Albert Spalding, violinist, and Frieda Hempel, soprano, drew prolonged applause, and B. A. Rolfe and his orchestra played with much acceptance during the meeting and for the formal dance that followed its adjournment.

The report of the public policy committee was read by W. W. Freeman. It stressed the development of the industry by following sound public service policies. Mr. Freeman declared, "The electrical industry has been progressive; it has not stood still. From the beginning the men responsible for electrical development have realized the enormous contributions in useful service that electricity has made and will continue to make to the whole national and community welfare, to workers and to homes, to all phases of economic and social life. They understand and assume the obligation to unfold the full possibilities of electric service and translate them into everyday use."

The report dwelt on the constructive policy of rural electrification, the policy of economical system building, of rate reductions when justified and other matters of long-tried effectiveness. It told of the co-operative attitude taken by the utilities in the Federal Trade Commission investigation and looked for the result unafraid.

Public Relations Session

Chairman Owens defends educational committee and information bureaus. John F. Gilchrist on Superhumans. Forbes award to Puget Sound Light & Power. What women want from electricity

J. F. OWENS, chairman, at the session of the Public Relations National Section on Thursday afternoon warmly defended its activities, which have been under investigation by the Federal Trade Commission. He called attention to the fact that the committee on co-operation with educational institutions and the state information bureaus "have been the focal point of attack from certain sections of the press."

After explaining the purpose of the committee on co-operation with educational institutions, Mr. Owens stated that "it was with the thought of ascertaining the extent to which this co-operation had existed and of mapping out a program through which it might be promoted that it was finally determined by the committee, which had already made recommendations as to co-operation, that the definite program should be based upon an actual survey of the situation in respect to co-operation in the various parts of the country, and this led to the securing of the services of Dean C. O. Ruggles, then with the Ohio State University, for the purpose of making such a survey."

Forcibly justifying the work and purposes of the committee, Mr. Owens said: "If this business of ours is destined to play in future an even more important part than it has in the past in the social, economic and industrial life of the nation, it is important enough to have brought to bear upon its development the best thought of the best trained minds in the nation."

Claiming that the great operating utilities are the only reliable source of information regarding the utility industry, Mr. Owens asked: "Where is the educator to go, if not to the electric light and power companies, for

the information that he needs in fitting the young minds in his charge to cope with the problems which the introduction of this new force is bringing to the social order?" To this he added that most of the co-operation that had hitherto existed between educational institutions on the one hand and the electric light and power companies on the other had its inception "in the eagerness of educators to gather from electric light and power companies the facts needed by them for proper presentation of the industry's place in the modern scheme of things."

Passing to the subject of the various state bureaus of public utility information, Mr. Owens explained that they came into existence because of a feeling on the part of many leaders of the industry "that the public should be kept fully informed by operating companies, using for that purpose the recognized channels of information, and setting up for companies unable to maintain such equipment for themselves a vehicle through which this information could readily be conveyed." He also said that "newspapers have in the past come to lean on these bureaus for news that to them appeared timely and relative to the progress and growth of the companies in their state. Speakers and writers have found the information furnished by these bureaus timely and accurate."

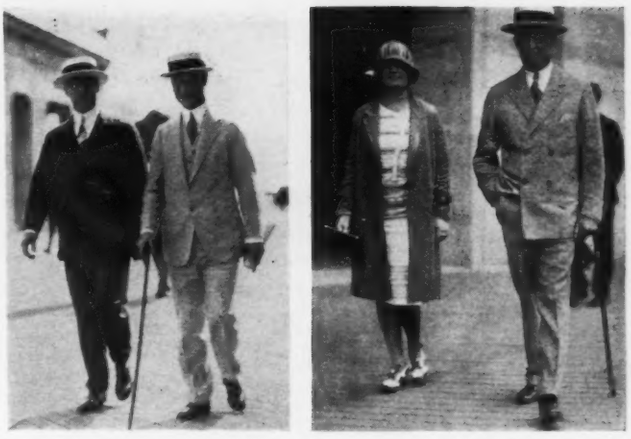
Personal obligations of the men and women of the industry formed the topic of a remarkably fine and inspiring address by John F. Gilchrist entitled "Superhumans for Better Institutions."

He pointed out that the electrical industry was one that gives one man the producing power of scores of men of only a few generations past, that spreads the noonday light over the hours of darkness, that for a trifle provides the poor of today with relief from grinding labor and with comforts and conveniences, life lengtheners, which the money of the rich could not buy in the days of our grandparents. Speaking more directly, he said:

"Upon you rests the responsibility for the proper development of a great fundamental industry, possibly to become the greatest of all industries and the one to which more than to any other the people of our country and the world will be indebted for the greatest measure of human life and happines.

"Looking to the future, the greatest need of this industry is for men and women, or, might I say? for superior men and women, superior in mental and physical vigor, superior in common sense, superior in general and special education, trained young people with an intimate knowledge of the present-day conditions in the business in which they expect to embark, so that on embarking there shall be the least time lost in finding themselves."

Mr. Gilchrist then developed ways and means and methods of co-operation whereby men and women within the industry and in educational institutions could be trained to meet the demands of the future. He concluded that much can be done to provide for the future if all concerned will co-operate and make the best use of the knowledge now available. If the student, anxious to prepare himself for a useful and effective life, the educator devoting his education and culture to the turning out of a well-developed, well-educated and practical human product and the executive in the electrical industry who are in a position to have the best vision of what is required, will work together on this problem, he asserted, they certainly can accomplish much.



J. E. Davidson, C. S. McCalla, and Frank C. Sargent

At this meeting B. C. Forbes announced that, for thorough and enterprising work in public relations, conspicuous energy in the development of rural business, successful load building in the face of municipal competition, harmonious architecture in plants and substations, effective use of radio broadcasting, friendly service to its customer and businesslike administration, the Forbes public service cup for 1929 had been awarded to the Puget Sound Power & Light Company.

An interesting feature was an address on "The Part Electricity Can Play in Better Home Management" by Miss Lita Bane, past-president of the American Home Economic Association. She said that while there may be a limited demand for specialties of some kinds, women seem to agree that they would like to see the major efforts of electric service in the home directed to devising power machinery to take care of the time-consuming, heavy, frequently-recurring, likely-to-be-monotonous tasks. It seems probable, also, that the home may regain some of its former prestige as a center of recreation for the family and small groups of friends. Electricity is making a direct contribution to this situation through the radio and electrically operated musical instruments and, indirectly, by making the house more comfortable and convenient for the entertainment of guests. It will undoubtedly make even larger contributions in the future.

Some of Miss Bane's suggestions to the industry were:

1. To produce and sell electrical service as cheaply as possible.
2. To study carefully the needs of home managers in order that money and effort may not be wasted in producing useless tools.
3. To produce electrically driven machinery which shall be as simple and as cheap as it is possible to make it.
4. To offer women careful training in the use, care and simple repair of household equipment. It is suggested that women are particularly successful in this work of helping to overcome their sex's prejudice regarding "machinery."
5. That care be exercised in putting into a home only suitable and needed equipment which its budget can carry without undue worry and strain.
6. One special need emphasized was the needs of the farm home where in many instances an undue, almost an unfair, amount of manual work has still to be done by the housewife.

Commercial Session

Sales, sales and more sales the desideratum. Lighting, merchandise and power bureaus report. Preservation of food. Prize awards to central-station companies

THE vast commercial opportunity now before the electrical industry and the necessity for taking immediate action to increase sales were subjects stressed by one speaker after another during the Commercial Section session of Wednesday afternoon, at which Chairman Marshall E. Sampsell presided.

T. O. Kennedy, chairman of the Lighting Bureau, reviewed the several campaigns carried out during the year and declared that millions of customers are not now making use of the lighting facilities afforded them.

V. M. F. Tallman, chairman of the Power Bureau, called for commercial action, but testified to the strenuous competition which electric power and electric heating are experiencing from internal-combustion engines and commercial fuels. He said in these fields it is now sometimes harder to hold old business than to secure new business. He urged careful study of the customer's problem by the man who undertakes a selling job.

Frank D. Pembleton, chairman of the Merchandising Bureau, reviewed the work done by the committees on refrigeration, electric water heating, the electric range and domestic uses of electricity. Mr. Pembleton urged setting up a style or "craze" for electrical appliances, similar to that now manifesting itself for radio or for color in bathrooms and kitchens. With such a fad movement, aided by intensive advertising, Mr. Pembleton predicted that last year's appliance sales of $750,000,000 could be doubled within the next five years.

P. M. Zimmerman, secretary of the National Food Preservation Council, described the September campaign to awaken public understanding to the food spoilage that takes place at temperatures above 50 deg. F. and showed how electric refrigeration could be financed out of food wastes in the average family food budget of $6.29 annually.

Gerald Swope, president of the General Electric Company, declared that the whole theory of central-station commercial operation was admirably stated in the convention papers by Messrs. Sampsell and Sloan. The only thing that remains, said he, is for the industry to go to work and "play the game." An average residential consumption of only 456 kw.-hr. is an indictment of the central-station industry. Mr. Swope emphasized three factors, education of the public, price of merchandise and co-operation with the trade, as the three essentials to future commercial progress.

Martin J. Insull, president Middle West Utilities Company, urged diversification in the sale of power and predicted the increased importance of the commercial staff in the future as it comes to study its economic responsibilities.

C. E. Groesbeck, executive vice-president Electric Bond & Share Company, declared that it is the commercial department which makes the rest of the utility business go. He commented on the 280 per cent growth in the industry's output during the past decade, which has been obtained from 69 per cent increase in the number of customers. The residence load is the backbone of the business, he declared, and is one that can be increased with the least additional investment.

W. W. Freeman, president Society of Electrical Development, described the plans of the Industry Sales Conference and said that a complete program will soon be made public. America offers a huge undeveloped market for wiring, appliances and electrical service, and all experience has shown that sales are proportional to advertising effort expended.

Earl E. Whitehorne, McGraw-Hill publications, presented the prizes in the N.E.L.A. residential kilowatt-hour contest. Checks for $2,000 each were awarded to companies at Cheney, Wash.; Birmingham, Ala., and San Antonio, Tex., for respective increases as follows: 491 kw.-hr. to 686 kw.-hr.; 433 kw.-hr. to 496 kw.-hr., and 256 kw.-hr. to 415 kw.-hr. Second-prize checks of $1,000 each went to properties at Fresno, Calif.; Scottsbluff, Neb., and Beaumont, Tex. Honorable mention was awarded to Portland, Ore.; Durham, N. C.; Pueblo, Colo., and Annapolis, Md.

The Federal Electric Company $1,000 award for electrical advertising went to the Edison Electric Illuminating Company of Boston.

Engineering Session

Three outstanding topics are the economic aspects of standardization, system planning, and requirements of engineers

"SHALL We Grow Like Topsy or According to a Plan?" was the subject of an important address on Tuesday before the Engineering National Section in which A. C. Marshall, vice-president and general manager of the Detroit Edison Company, called attention to the mounting investment per dollar of earnings and the difficulty of offsetting it by commensurate reduction of operating expenses. He pointed out a number of necessary expenditures which do not bring additional earnings, although they do reduce operating expenses. Expansion of domestic utilization offers great possibilities, but so far the unit revenue has not increased much. Better and more comprehensive system planning affords an excellent method of securing more system capacity per dollar and would obviate much costly periodic rehabilitation now caused by not visualizing future needs more tangibly.

F. R. Phillips, president of the Duquesne Light Company, pointed out that the type of engineer for whom there will always be a crying need must be more than a technician; he must be a manager well versed in economics, finance and public affairs, possessing a sympathetic understanding, and a leader dominated by a desire to promote public welfare.

Practical and economic aspects of standardization were discussed by L. L. Elden, Edison Electric Illuminating Company of Boston, who cited some outstanding examples of standardization and benefits that have been obtained. Concentration upon a minimum number of types of systems for generation, transmission and distribution and the elimination of many odd voltages have been contributing factors to present success. But failure to adhere to the use of existing standard apparatus and insistence on special designs have materially retarded standardization.

In his report of the work of the National Engineering Section, E. C. Stone, chairman, gave an excellent résumé of investigations that have been made and developments in various equipment and apparatus, emphasizing the economic problems of engineering. Attention was also given to such timely topics as lightning protection

and cable research. As never before engineers are planning their work and expanding their technical interest to include economic, management and business principles, Mr. Stone observed.

Accounting Session

Economics and service. Professional ideals discussed by Malott, Arkwright and Jones. David Lawrence speaks on trends in government

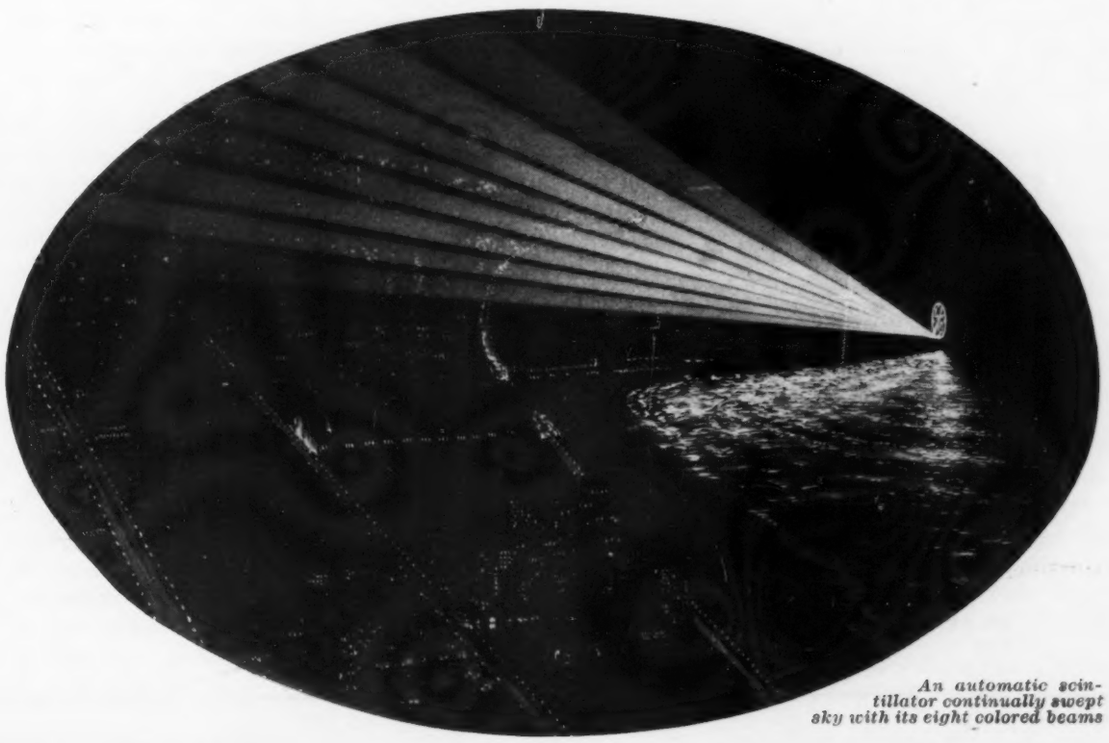
WESTMINSTER HALL, at the Hotel Chelsea, was filled with an enthusiastic audience Tuesday afternoon when Prof. Deane W. Malott, President Arkwright, W. A. Jones of the Cities Service Company and David Lawrence, president of the *United States Daily,* depicted the broadening interests of the accountant in relation to the development of the industry and set forth the importance of the economic viewpoint in public affairs.

J. F. Ford, national chairman, reviewed the past year's progress, emphasizing the close affiliation of the Accounting Section with others in the N. E. L. A. family. Professor Malott, who is assistant dean of the Harvard Graduate School of Business Administration, paid a tribute to the large vision in evidence in the electrical industry and predicted greater service by it in the future. Corruption and unhealthy propaganda are inseparable from every rapidly growing and exceedingly prosperous industry, but these faults have not been dominating motives in the power field. The modern corporation inevitably tends toward practicing higher ethics of business. The speaker stressed the growing importance of the professional motive in business. He advocated cutting electric rates to the limit in the interest of increased volume of service to the public.

President Arkwright made a short but telling address on the importance of net earnings in relation to the success of public utilities as prosperous organizations rendering good service to the people. He brought out the vital importance of accounting in the administration of the modern power company and declared that hope, enthusiasm and reward for good work still exist in the industry. No company can ever grow big enough to impose on any one; its very life is dependent on public favor, and records are as essential to proper forecasting as to an understanding of past operations.

W. B. S. Winans then read a paper by W. Alton Jones, first vice-president of the Cities Service Company, New York, which emphasized the importance of the accountant and his work in the study of future costs, in connection with investigations and regulation, interconnection contracts, the reduction of distribution costs, the study of isolated-plant economics and of customer expenses. Mr. Jones pointed out his belief that many would desert political ownership doctrines if informed as to the facts and costs of this policy, stressing the necessity of giving the public more facts in place of generalities adverse to the entry of the government into this business.

A comprehensive survey of the relation of the United States government to the changing conditions of the business world was presented by Mr. Lawrence. Based on his daily observation of the conduct of affairs at Washington, Mr. Lawrence declared that economic problems are rapidly coming to dominate administrative and legislative activities. He intimated that the year 1913 has ceased to be an adequate "norm" for economic comparisons and called attention to the current period as representing a possible new level of accomplishment from which future activities may be measured. He stressed the increasing tendency of the government to co-operate with business and urged a wider interest on the part of members of this industry and others in public affairs. Out of the government's regulative power may come the most enlighting self-help which the power industry could attain, provided the new viewpoint of those administering governmental activities is grasped by utility men and turned to account along co-operative lines.



An automatic scintillator continually swept sky with its eight colored beams

Significant Remarks

by

INDUSTRY LEADERS

P. S. Arkwright—"Serving the public" unfolds unlimited opportunity for business development. Such friends as a utility has, those engaged in the industry must gain for it. Such enemies as it gets, those in the industry make for it.

B. I. Budd—Remember that railroads are in the transportation business, and use motive power only as a means to that end.

George Gibbs—It is because of high first cost that the progress of electrifying steam railroads has been quite slow. The indirect savings are always very important in deciding upon electrification.

J. F. Owens—When we have given as much attention, care, thought and study to the human element as we have to mechanical equipment, then and not until then, can we expect our employees enthusiastically to help us hold public confidence and good will.

W. J. Hagenah—For the automobile business the weighted average yearly profit is 28 per cent of the net worth; for electric and gas utilities it is 9.2 per cent.

Deane W. Malott—Men who are in positions of leadership have come to make their ideal greater than themselves.

W. A. Jones—The modern business executive is more interested in the determination of future costs than in the perusal of the records of performance.

M. S. Sloan—The customer who makes the largest use of service is the best satisfied customer. Every case of reduction in domestic rates has been followed by increased use of service.

Gen. J. J. Carty—One of the outstanding factors in the success of the electrical industry is its encouragement of research in applied science.

Marshall E. Sampsell—A serious handicap to commercial progress is that rate structures are not sufficiently conducive to broad promotion of electricity. We can never satisfactorily develop a maximum volume of appliance sales until we have the complete and cordial support of all other merchandisers of electrical appliances.

L. L. Elden—Insistence on special designs and failure to use existing apparatus have materially retarded standardization.

Thomas N. McCarter

Without the initiative, without the enterprise, that comes with private as opposed to governmental operation, the electrical industry would never have reached its present stage of usefulness.

Sir Ernest Benn—Public ownership discourages those invaluable citizens who by nature are makers of wealth, and encourages incompetents.

T. O. Kennedy—We will have to confess that we have done a poor job of selling our service in the last 40 years.

William L. Ransom

There are many uses for which electricity is well adapted from which it is excluded by present rate forms.

A. W. Robertson—The response of the customer in the use of electric current will be exactly commensurate with the service he receives expressed in terms of the things he wants.

David Lawrence—It is on the regulatory phase of government that we have differences of opinion, but time will transform that activity into a cooperative influence.

J. F. Gilchrist—There is no question in my mind that the electrical industry will shortly pass the railroad transportation business in capital invested and yearly earnings.

F. D. Pembleton—Utility merchandising methods should be based on principles as unrevocable as those underlying engineering practice.

F. R. Phillips—The engineer for whom there is a crying need must be more than a technician; he must be a manager and a leader.

President Arkwright

"High-Spots" Year's Progress

National research program. Better intra-industry understanding. Results in accident prevention. Standardization, simplification and codification save millions. Participation in community activities. Record in serving farmer. Revived interest in railroad electrification. Accountants have helped customer relations. Outstanding public relations activities and importance of individuals

P. S. Arkwright

THIS convention occurs in the year of the fiftieth anniversary of the electric incandescent lamp and marks the beginning of a great nation-wide tribute to Thomas A. Edison and the observance of "Light's Golden Jubilee." The improvements in the lamp, combined with the wonderful development of the electric industry following in its wake, have brought such great reduction in its price that its enjoyment is now within the reach of any pocketbook.

But out of the lamp came the electrical industry, serving at first a limited area in the most congested section of our largest city and, through the ingenuity, initiative, courage and effort of men, growing by leaps and bounds through the short years, until we now have electric central stations with long-distance transmission and interconnected systems and their distribution networks, supplying house-to-house electric service for lighting, heating and power purposes to more than twenty-three million customers in the United States, in practically every city, town and hamlet.

Of the recent forces in the economic structure of the nation none has been more fundamental in advancing the living standards than mass production. Mass production of electric power is outstanding among these. I refer to the creation of these great interconnected electrical systems concentrating major power production in large, efficient power houses, then diffusing and subdividing this power as required for smallest or largest user in city or hamlet, in the home, the factory or on the farm. Our engineers, through the medium of the association, years ago formulated and secured wide acceptance of standard voltages, frequencies and operating practices, thereby laying the essential background which made possible the interconnection of adjacent power systems.

The growing reliance of the country's manufacture and mining upon electric utilities for their added power supplies is convincing evidence of the remarkable performance of the power companies in providing low-cost, reliable power deliverable at almost any point in any quantity desired.

The trend is toward larger and more efficient units for power production. Size of turbine and generating units has increased in ten years from 40,000 kw. to 208,000 kw. Single power houses are under construction to house 1,000,000 hp. The average quantity of fuel burned per kilowatt-hour in 1919 was 3.2 lb. Continued improvement in power-house design and operation pushed this average consumption per kilowatt-hour to 1.76 lb. for 1928. The aggregate saving due to gains in efficiencies since 1919 amounts to 180,000,000 tons.

The association is directing aggressive attention to transmission and distribution, design, construction methods, operating and maintenance practice and safety rules in both overhead and underground systems. High-voltage cables are under experimental research. Ways are being sought to transmit more economically the increased quantities of power in both overhead wires and underground cables, in spite of increasingly difficult conditions that arise from congestion. Marking and lighting of power structures within airways, power-line crossings over railroads, co-ordination of the operation of our service with telephone, telegraph, train control and radio —all involving important relations with other public service—are enlisting your association's consideration.

Our engineers have focused particular attention upon sound, advance planning of whole electrical systems, anticipating future requirements of the communities served and visualizing the step-by-step placement of power houses and transmission structures to meet adequately the power requirements of each locality at minimum cost. Because of this system planning, electric power facilities, taking the country as a whole, are located and constructed for maximum utilization, most economic operation and without wasteful duplication.

Research.—Participation along with other industries in a pure science research program will be undertaken in the colleges and universities as soon as plans are finally formulated by the National Research Council and the National Academy of Sciences.

Co-operation.—There has been decided progress in better understanding between the manufacturer, the contractor-dealer and all merchandisers of electrical equipment. The fine work of the National Electrical Manufacturers' Association, the Association of Electragists International and the Society for Electrical Development and their co-operation with the National Electric Light Association have been contributing factors to this enlarged mutual understanding and direction of common effort toward fuller electrical development.

Accident Prevention.—A direct measure of the great human value of accident prevention activities is the award in seven years of Insull medals to 71 persons for saving life.

Standardization.—Standardization, simplification and codification have constituted a decided factor in lowering cost and facility in use of electric service. This work could not be accomplished by any company acting individually; it requires expression of industry viewpoint at more than two hundred points of contact with national and international standardizing groups. The savings that inure to the companies in reduced costs of equipment, reduction of inventories and facility in repairs amount to millions of dollars annually.

Community Development.—The electric utility company prospers only as the individual community prospers. Our investments in facilities are an integral part of the thousands of communities we serve. If business is better elsewhere, we cannot pick up and move. Recognizing this, the Association is assisting and urging its member companies to more actively participate in local community and state development.

Rural Service.—Decided progress has been made in extension of electric service to farms, an increase of 30 per cent being credited to this year, which brings the total served to half a million. It is perhaps the most significant accomplishment of the year. Research in rural electrification continues in a number of state experimental projects, and a national rural research project is under way in Maryland. A vast body of practical information on adaptations of electricity to farm work has been developed and diffused. It aids the farmer in visualization of benefits of electric service to him; it stimulates us to greater effort in overcoming problems of extension of our service to him.

Railroad Electrification.—Increased volume of freight and passenger traffic, arising from growing population and advancing prosperity, has stimulated further attention by railroads to main-line and terminal electrification. Electrification programs have been announced this year by the Pennsylvania, Philadelphia & Reading and Lackawanna railroads. Other railroads have electrification plans under study.

Accounting.—The Accounting Section is giving special attention to accounting for interconnection, merchandise accounting, budgeting and the latest questions in the field of investment trusts. Continued study has been applied to simplification of procedure in forms and records, particularly in simplification of customer records and bills. Savings attained in reducing cost of handling these accounts represent thousands of dollars. The care and attention given by our accountants to methods of maintaining customers' accounts and billings have been a most important factor in improved customer relations, for the only point of contact with many of our customers is through the monthly bill.

Public Relations.—During the year the industry has borne the brunt of the assault of those who would nationalize the country's industries, businesses and professions. Despite this, the Public Relations National Section has carried on its constructive work of aiding and directing the industry in its duty of fully informing the public. Among the many committee activities are two outstanding developments. One is the study made of industrial relations by a committee of that name which includes health and medical and employee-contact practices and instruction. The other is a study of the migration of industry made by the Metropolitan Life Insurance Company in co-operation with the civic development committee of this section.

Commercial.—Problems of marketing are confronting our industry no less than other industries producing products for distribution. Surveys reveal our accomplishments of the past and unfold almost limitless opportunity for commercial expansion. Whether we vision the future all-electric home or the vast sales possibilities in the application of electricity in commerce and industry and in the industrializing of the farm, our conclusion is the same. And yet we realize as never before how keen our competition is in the selling field.

Important problems of market analysis, the construction of industry-selling programs, the development of salesmen and methods to cope with modern requirements of highly specialized selling are being promoted.

Geographic Divisions.—An electric light and power company in and by itself can make no enemies, can gain no friends, can do no wrong. Such friends as it is to have those engaged in the industry must gain for it. Such enemies as it gets those in the industry make for it. It has only such character as the men and women who are operating and managing these companies give to it.

In going around the country and meeting the men and women from all sections I have been, above all, impressed with the outstanding character, the exceptionally high ideals of business conduct and integrity possessed by the men and women engaged in the electric light and power industry. They are seeking to operate the properties at a profit, of course, because a business service must earn its way if the business service is to continue; but there is a striking absence of greed among them. They are endeavoring to furnish a useful service at a reasonable rate of pay. Practically every company in the entire United States during the last 18 to 24 months has revised some of its rates downward so that its average rates are each year less than the year before.

Customer's Side of Meter

Service obtained from electric applications, not kilowatt-hours, interests the customer. Therefore major attention should be given to the right kind of appliances, facilities for using and reliable service

By A. W. ROBERTSON
Chairman Westinghouse Electric & Manufacturing Company

A. W. Robertson

WHAT the customer buys is, first of all, light—not electric current, but light. Then he buys heat; or, rather, hot fragrant coffee, crisp bacon, hot toast and waffles, and all the magical things that come out of the chafing dish and off the electric range. Finally, he buys some form of action, such as is manifested by the vacuum cleaner, the washing machine, the ironer, the electric fan, and many other devices, but none of these things purchased by the consumer has the remotest connection in his mind with kilowatt-hours or watts.

"Well, what of it?" If the consumer is primarily interested in buying hot coffee, rather than kilowatt-hours, from the great power company that serves him, then that great power company must interest itself in furnishing that coffee.

How are we meeting this problem of furnishing the customer, not with electric current, but with the services which flow from the proper use of electric current? One thing is certain—the response of the customer in the use of electric current will be exactly commensurate with the service he receives expressed in terms of the things he wants. In other words, if the electric iron works perfectly, the housewife uses it frequently and buys another as soon as it wears out—if a modern iron ever does wear out. If the vacuum cleaner is reliable, it is constantly in service and is replaced by a new one as soon as it is done for, and so on.

But if the iron is unsatisfactory, due to some fault in the iron, or the circuit, or what-not, it goes onto the shelf and the housekeeper sticks to the good old-fashioned things she was brought up with. So it would appear to be the better part of wisdom to see that the facilities which enable consumers to receive in their homes those comforts and conveniences which they want are maintained in a high state of efficiency. Their reliability must be unquestioned, they must be economical, they must be convenient, they must be serviceable, and they must, of course, be foolproof, so that they may be used frequently, without any danger whatever.

We have already reached a high degree of perfection in meeting this standard, but it is a field where there is much yet to be done. Neither the power companies nor a few manufacturers control the situation. The facilities used in the average home are produced by more than 1,000 manufacturers and are for sale in more or less variety in at least 25,000 electrical, department, hardware and other stores. The power company might well say that if it controlled the appliances the consumer fastens to the sockets, it could then be sure that the service would be exactly what the most exacting critic would require, but inasmuch as the consumer is free to buy his appliances from any one, the power company is absolved from all responsibility. There is nothing to prevent the power company from taking this attitude, but that will in no sense relieve it from the criticism the consumer is going to make when he fails to get the hot coffee which he conceives he is buying from the power company. In other words, the power companies and the electrical industry as a whole are going to be blamed for the failure of any member of the industry, whether he is a maker of switches, coffee percolators, Christmas tree devices, or what-not. All of these simple things contribute to make electric service good or bad, as far as the consumer is concerned, and if it is bad, he is dissatisfied and lends a willing ear to the gossip of the fault-finder.

We can do very much more if we will look upon our merchandising facilities not only as money-making departments, to be run on a sound economic basis, but also as places where the right type and kind of appliances at different price levels are on display for the information of the customers of the power company.

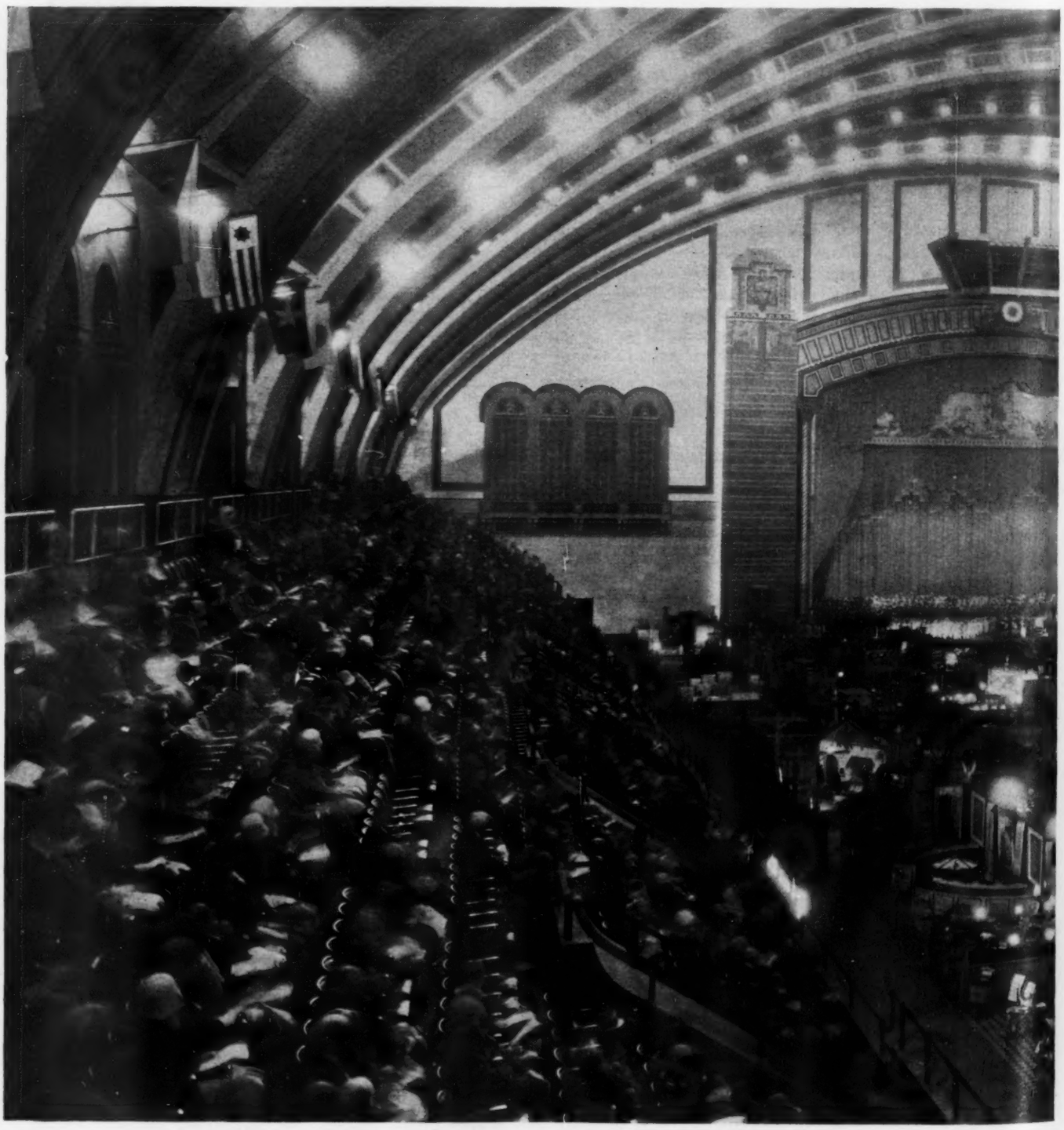
We should stimulate architects and builders to put into new homes and apartments only standard, high-grade appliances. Encourage in every way possible the use of right appliances as against unreliable devices, which, if they should fail, bring down upon the heads of manufacturer, public utility, and all of us, criticism which is difficult to answer.

What the Exhibits

A GLANCE from the balcony of the wonderful auditorium afforded the observer a panorama of the electrical industry. Aisle after aisle contained elaborately decorated booths filled to repletion with manufactured equipment used in the industry. The big things, the new things and modifications of the old things attracted interested visitors by the thousands and gave them opportunity to get first-hand information about the most modern equipment.

To one who has attended N.E.L.A. conventions over a period of years there comes conviction that the exhibits are a major part of the meetings. They afford a liberal education because of the opportunity to inspect the most modern apparatus; they interpret the problems and trends in the industry; they make it possible to measure progress, and they afford opportunity for the exchange of tangible ideas between the makers and users of equipment.

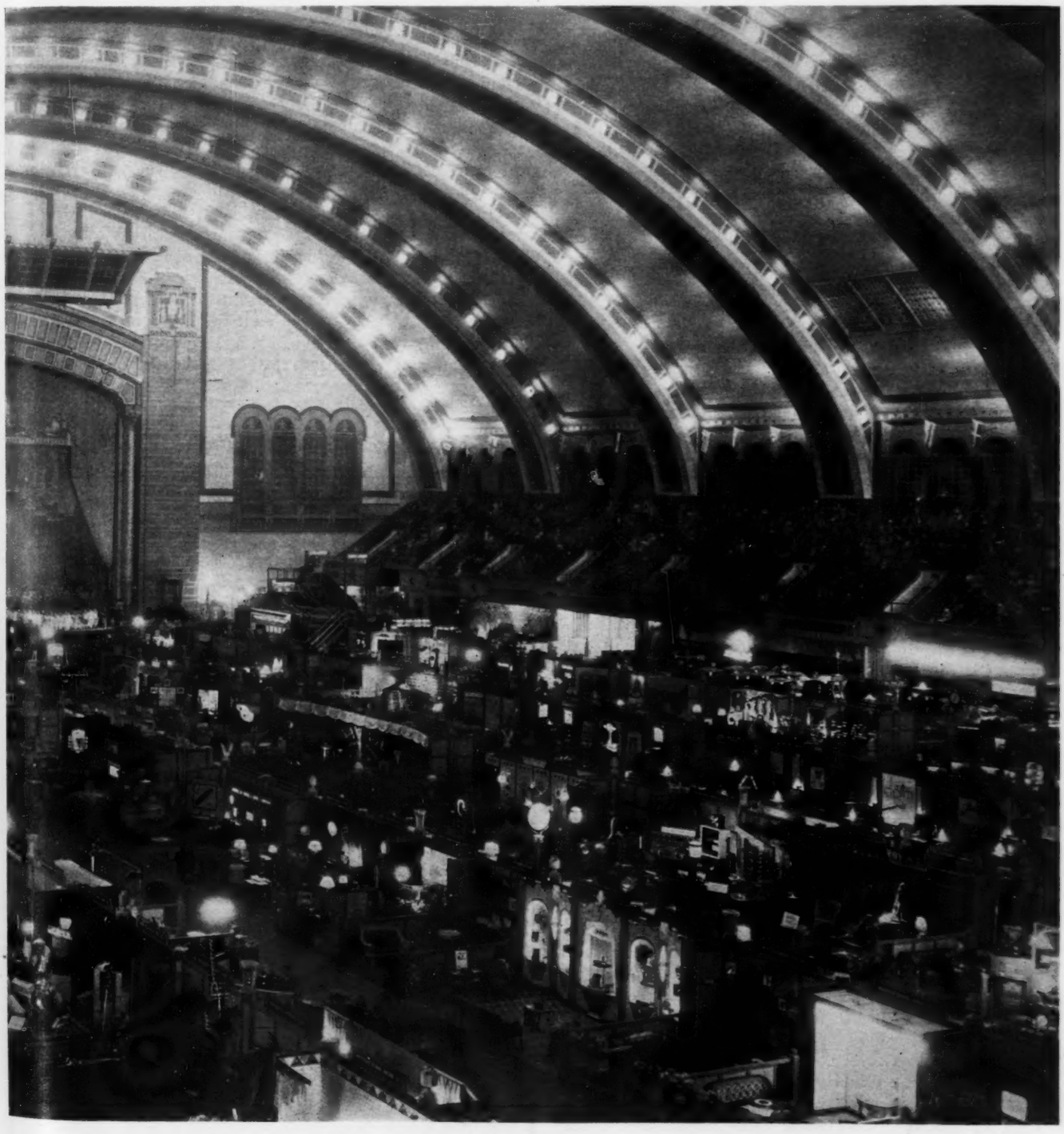
A striking impression gained at recent N.E.L.A. exhibits is the growth of volume in load-building appliances. Last week showed ranges, refrigerators, water



Showed Visitors

heaters, toasters, washing machines, vacuum cleaners, health appliances and a host of miscellaneous devices developed for the homes. At the recent exhibit a striking increase was noted in the space devoted to oil burners, water-heating and health appliances. Interest in electric water heating is very great if the testimony of the exhibitors is heard, and an entirely new industry group has sprung up to deal with ultra-violet lamps, belt vibrators and other appliances made for application to the human body.

The many novel forms of appliances are but a result of the public's realization that electricity can play the rôle of housewife and general handy man not only more efficiently and thoroughly but in the exact way the master and mistress wish. Witness the many types of small-size vacuum cleaners and electric vacuum whisk brooms which have sprung into being during the last year. Flatirons and ironing machines of various sizes and complexity, new well-designed dishwashing machines for family use, and vibrating health machines of various cost, size and



weight are other notable features from a large list. Not only has specialized service been provided for the owner of these appliances, but his or her tastes and whims have been considered. There is noticeable an increasing use of chromium finishes for table and kitchen utensils, and new alloys such as super-radium are brought to the fore. Coupled with this we see the influence of the modernistic furniture designs reflected in coffee urns, etc. In addition there can be seen further steps toward the perfection which comes only as a result of sober redesign and better engineering. Refrigerators are more efficient, less noisy and have special features such as adjustable rates of cooling. The meaning to the industry of all the home appliances is that equipment is ready for use and can be counted upon to give utilities an enormous increase in domestic business. A sales job must be done.

Lights and lighting equipment were in evidence to an unusual degree because of this jubilee year. The use of models to convey a conception of modern lighting was prevalent. Airports, homes, business districts, room interiors, industrial plants and other places where light is used were presented in miniature with great fidelity and effectiveness. A noticeable trend was the use of light for decorative purposes and the growth of a closer relationship of lighting with architecture. This last trend was very noticeable in that the lighting of the new auditorium was remarkable for its departure from the stereotyped. A harmonious structure was seen in which lighting had been built into the architectural plans in what might well be called panel effects.

Another new and interesting development at the convention was the use of talking motion pictures. At the session this innovation was welcomed with applause. This leads to the thought that the portable motion projection equipment on exhibition at the convention for the first time, and extremely valuable in itself to show industries in action, presages the advent of talking pictures for educational purposes.

Power Apparatus Improved

The familiar power apparatus was evident in all its forms. Larger and better designs were on view, many modifications in old types were seen, the influence of arc welding and fabrication manufacturing processes was evident, and several new types of apparatus were exhibited. Among the outstanding equipment were a 3,000-kva. mercury-arc rectifier, a compact manhole transformer complete with primary disconnecting switch and low-tension network protector, a new high-strength copper-brass cable, new oil breakers and disconnecting switches, new designs of 220-kv. disconnecting switches, fuses of new types and used in combination assemblies, a new non-metallic sheath cable for airport lighting, new sleeve joints for cables, improved inclosed switchgear, the new Deion circuit breaker, late developments in remote control, several new meters and relays, automatic devices for switch and transformer tap-changing devices, new developments in insulators and flashover protective devices, a new type of motor starter and newly designed boiler and furnace equipment and controls. Ruggedness, safety and compactness characterized the trend in apparatus. Another trend that was noticeable was the advent of tools, hardware and controls that reduce the danger hazard, reduce the time required to do work, reduce the labor charges and eliminate the possibility of human errors in utility operations.

One of the most impressive facts manifested in the exhibition is the progress made and the new methods discovered for metering. Influenced by the value of having a bird's-eye view of the steam part of a power house recorded on a panelboard, one manufacturer displayed remote-indicating boiler instruments. The integrated frequency meter of another manufacturer with its high precision caught the eyes of many utility engineers. Important to him also is this company's automatic frequency control, which has recently been successfully extended to control two systems when both are regulated.

For the metering departments of utilities another manufacturer had developed new adjustable resistance and reactance load standards. This company also displayed a new type of calibrating outfit for potential transformers and also one for current transformers of single or double ratios. Another manufacturer showed a new and ingenious method for the calibration of watt-hour meters.

The engineers of another manufacturer have developed a complete new line of switchboard instruments which will eventually replace their well-known line of horizontal edgewise instruments. These new instruments are rectangular in shape and very compact, have an easily read and clear scale and use a newly developed glare-proof glass which eliminates the objectionable specular reflection. There was exhibited also a new type of curve-drawing voltmeter, showing many improvements over its predecessor, which can be used either as switchboard instrument or as a portable unit. Space prohibits mention of other instrument and control developments.

A pleasing feature of the exhibits was the splendid display of the work that the N.E.L.A. is doing. Another trend that should be encouraged was shown by the displays of several utility companies. These added to the variety of the exhibits and were instructive and interesting.

Many comments were heard to the effect that N.E.L.A. visitors were delighted with the exhibits this year. All of the 800 booths had a beauty and a unity that was contributed to by the new auditorium, and an entire day was hardly sufficient to view the many interesting features. More and more manufacturers are showing only new designs and equipment, and this conserves the time of the visitors and concentrates interest.

It is very evident that progress is made each year—new lines are produced, new designs are made to fit changed conditions, improved materials are used promptly. A group of alert and responsive manufacturers add their full quota to the growth of the marvelous electric light and power industry, and the exhibits at Atlantic City afforded tangible evidence to this effect.

The production and distribution of electricity is an industry engaging directly between three and four hundred thousands of our people.

An industry engaging ten billions of the savings of our people, and therefore more democratically owned and managed than any of our great industries, for its seven to ten millions of average citizen-owners far outstrip in numbers that other great group which owns the farms of the country.

—John F. Gilchrist

Sales Increase or Rate Increase?

Advantages of shortening time of capital turnover by cultivating domestic business and building permanent load to offset economic handicaps

By M. S. Sloan
President New York Edison Company

M. S. Sloan

TRENDS in our industry over a period of several years show that it is slowly being squeezed between the jaws of a pair of pincers. One jaw is a decline in the kilowatt-hour sales and revenue for each dollar of investment. The other jaw is a rising investment per kilowatt of installed generating capacity.

In spite of this squeezing, our rate of return has lowered only slightly in the period under consideration. The return has thus held up because of a splendid steady increase in operating efficiency produced by our engineers and economies in financing and other phases of management produced by consolidations and groupings of operating companies. The excellent financial showings the electrical utilities in general are able to make at present are a tribute to technical progressiveness and administrative ability. They must in time, however, reflect the trends in sales and investment if those are not corrected.

In 1922 there were sold 7.54 kw.-hr. for each dollar invested in plant and equipment. In 1927 this figure dropped to 6.61 kw.-hr., a decrease of 12½ per cent. The average price a kilowatt-hour sold for in 1922 was 2.81 cents, while in 1927 it was 2.71 cents, a decrease of 3½ per cent. The revenue for the dollar of investment in 1922 was 21.1 cents. In 1927 it had decreased to 17.9 cents, or 15 per cent. The 1922 rate of capital turnover was once in 4.72 years. In 1927 it was once in 5.58 years, or 18 per cent longer. In this period, from 1922 to 1927, the installed generating capacity increased 78 per cent. The average generation per kilowatt installed increased 4 per cent. The investment per kilowatt installed increased from $312 to $367, or 17½ per cent. The balance available for interest, dividends and surplus showed an average rate of return for the industry in 1922 of 7.58 per cent. In 1926 it was 7.30 per cent. In 1927 it was 7.48 per cent.

Since the war our industry has carried on a tremendous building program. As an industry we have invested in such extension each year three-quarters of a billion dollars or more. We have made up for any deficiencies of construction during the war period and have built ahead of demand, as it was our duty to do. We have built into less densely populated territory. The net result has been that costs of transmission and distribution facilities have been heavier in proportion to the unit of energy sold than when we were dealing with large city groups, or even the average of urban population. This condition will continue. In very large degree the urban population of the country is now on our lines. Aside from the natural growth of population, the new customers we shall obtain will be those in the outlying districts, so it is not reasonable to suppose that investment costs will turn downward.

Now, with those elements taken into consideration, what do our figures show us?

First—The average revenue from a kilowatt sold to the ultimate user is just about stabilized. The tendency, however, is downward.

Second—The trend of revenue in relation to the dollar of investment is distinctly downward.

Third—The time of capital turnover is markedly lengthening.

Fourth—The investment per kilowatt of installed generating capacity is increasing.

Fifth—The return on the investment has been approximately stabilized since 1922.

On that showing, the question "Shall we increase our sales or our rates?" becomes distinctly and sharply pertinent.

Rate Increase Out of Question

There can be but one answer to that question. We do not want to seek rate increases. We want to continue the course of our industry's development, which has been marked by a steady decline in prices charged for service. We could not afford to raise the prices now even if we did want to, for such a policy would inevitably decrease our sales and antagonize the public.

The answer to this question, then, is that we must sell more kilowatt-hours for each dollar of investment, making our equipment work harder and steadier, and the place to sell more service, in my judgment, is in the home. There are nineteen million homes on our lines. The average use of electricity in these homes is figured at 456 kw.-hr. during 1928. That represents an increase of 27 kw.-hr. over 1927, which year produced an increase of 25 kw.-hr. over 1926. It is gratifying that there were

these increases, yet their size really does not seem anything to cheer about.

This figure of 456 kw.-hr. please remember, is the average for the country. In many districts of the country it is exceeded largely. There are, for example, annual sales of 546 kw.-hr. at an average price of 4.94 cents, of 580 kw.-hr. at 4.52 cents, of 577 kw.-hr. at 4.87 cents, of 717 kw.-hr. at 4.88 cents and of 735 kw.-hr. at 3.3 cents.

It is obviously not likely that every electric utility can equal such sales. It is distinctly possible, however, for most companies so to increase their domestic sales that the average for the country will jump a good deal more than 25 kw.-hr. or 27 kw.-hr. a year.

Domestic sales should be vigorously stimulated for several reasons. The first is that they are and always will remain the backbone of our business. Industrial use of electricity, and to a somewhat less extent commercial use, will fluctuate with the state of business health of the country. We have seen this in recent years. In 1922 industrial sales were about 6 per cent below the average. In 1926 they were about 6 per cent above. There is very little fluctuation in domestic use of our service. When we add to the domestic load, therefore, we put on what amounts to a permanent increase in business.

Another reason is that domestic business is highly desirable business. Once the customer is beyond the point of use which pays for the fixed expenses of serving him, the chief expense incurred by the company in furnishing additional kilowatt-hours is that of generating the energy.

Moreover, increased domestic load is an important element in improving the load factor of the respective companies.

The third reason is that the customer who makes the largest use of service is, in all human probability, the best satisfied customer. We seek to improve our relations with the public by furnishing information about our business, by public speaking, by advertising.

A fourth reason is that we have a social duty to increase the domestic use of electricity. Electric utilities are not alone business enterprises. They are also organizations for public service. They obtain their franchises on that basis. With them they acquire certain responsibilities. One of these responsibilities, as I see it, is to do everything possible to make their service most widely useful to the public. We have for sale more than kilowatt-hours. We have for sale comfort, convenience, time saving and freedom from drudgery. We have for sale better home conditions, higher standards of living.

It is our privilege and duty to approach our sales problem from that point of view as well as from the point of view of increasing our revenues. If we neglect it, we may be sound business organizations, but we fail to live up to our responsibilities as public utilities.

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It seems to me more than a coincidence that in every case I know of a reduction in domestic electric rates has been followed by increased use of service. Those companies which show the highest annual domestic sales also show the lowest rates. We have, therefore, in the experience of our industry what may be accepted as a guiding principle in stimulation of sales of service for domestic use. The way to increase such sales is wisely and properly to lower the domestic rates, and along inducement lines.

For a number of years we have been patting ourselves on the back over the million and a half new homes brought on our lines each year. In truth the figures have represented a high tribute to the value of electric service and have been something about which we might properly be gratified. Yet, having obtained these customers, we have not been doing our full duty to our companies in respect to them; neither have we been doing our full duty to them. We have not been selling these customers all the electric service they could profitably use in the various processes of running a modern household.

Here with our nineteen million domestic customers is a field to cultivate which will yield us, properly cultivated, more sales to the dollar of investment without adding to that investment; which will increase the average revenue to the dollar of investment, even on lowered rates; which will tend to shorten the time of capital turnover; which will produce a practically permanent increase of sales not subject to the fluctuations due to business depression.

Here is a situation, it seems to me, which concerns all companies in our industry, because, however well any may be doing in respect of domestic sales, none has reached the limit of possibility. Indeed, who can tell what the limit is when Mr. Edison himself says that electricity will not have done its full job as long as humanity uses for any tasks some agency which electric service could better? Obviously, each company will have to meet this situation according to its own local conditions and in its own time and manner. Each company, however, will have to meet it. Our nation's standards of living do not stand still. They are constantly being revised upward. Society's demands upon our industry do not stand still. They also are constantly being revised, and on the whole I believe in no unfair spirit.

Clearly, the demand now is for a way of making possible more use of electric service in the American home. That demand coincides with our need as an industry, and there is within the industry the experience and general indication of how to meet it with mutual benefit.

This Problem of

Human Relations

Recommendations on co-operating with educational institutions. Continuance of information bureaus up to local companies. Service motive essential to lasting success. Selection and training of human element

By J. F. OWENS
Chairman Public Relations National Section

DURING the past year our industry has been subjected to criticism in relation to some of the co-operative activities. There exist in some quarters a misinterpretation of our motives and the opinion that there has not always been shown a complete appreciation of the high ethical standards which must at all times prevail in such activities. The committee on co-operating with educational institutions is convinced that modification of our present organization would reasonably provide in the future against any occasion for adverse criticism of co-operative relationships and further strengthen the field of useful co-operation.

We recognize the fact that co-operation cannot be exercised efficiently or in the public interest merely through a centralized committee out of touch and inadequately acquainted with local conditions, demands or sentiments. Our organization rests upon a basis of voluntary co-operation as its mainspring. The major responsibility must remain local and any attempt at centralized control would be ineffective. A survey of the entire situation leads to the following conclusions:

It is desirable that there should be established in an authoritative way guiding principles to control future co-operative activities, such principles being in general those which should prevail between educational institutions on the one hand and electric light and power companies on the other hand. Such principles can be best declared in an authoritative way by educational administrators of national standing and experience. We recommend the furtherance and encouragement of such measures as may be best fitted to secure such declaration of principles.

More efficient co-operation is needed within our organization to assure sound development of relations with educational institutions, free from legitimate criticism, and such as to sustain with the educators that confidence in our activities and purposes that must at all times prevail if the best interests of the public and all concerned are to be served. The following plan will lead to this result without trespassing on the full measure of local responsibility in such activities and we recommend that steps be taken to put the plan in effect in the immediate future:

We recommend that each geographic representative of this committee take up with leading executives in each state within his division the initiation of such steps by the utility executives in connection with administrative heads of educational institutions as will bring about in each state the selection of an industry representative satisfactory to the educational institutions, to whom in each state there shall be referred for approval all proposed co-operative activities.

We further recommend that such representatives be requested to act as the state representatives on the geographic division committee of this committee.

J. F. Owens

Certainly our industry, occupying such an important place in the scheme of things, deserves the careful attention of educators. So rapidly has it grown and so rapidly is it developing that it is almost beyond the power of those in intimate contact with its development, those who are wont to call themselves a part of this development, those whose brains and minds and hearts are given to it, to keep abreast of its progress in all of its phases.

If this business of ours is destined to play in the future even a more important part than it has in the past in the social, economic and industrial life of the nation, it is important enough to have brought to bear upon its development the best thought of the best trained minds in the nation. It is important enough that the youth of the land, who are being poured out annually from the colleges and universities of the country into this whirlpool of the present social order, are allowed to drink from the running stream of current facts, rather than from the stagnant pool of worn-out ideas, pools poisoned as they frequently are by the sophistries of discredited theorists. That the youth of the land, going forth from our great universities to be the molders of public opinion in the future, should have the benefit of facts relative to the evolution and operation of our business goes without saying.

If the students of the universities and colleges are to drink from the pure stream of current facts, they must have free access to the only reliable source of informa-

tion, the great operating utilities of the electric light and power industry.

What better than the operating companies can be found to serve as a basis for authoritative information on the application of electricity to modern-day needs. Where is the educator to go, if not to the electric light and power companies, for the information that he needs in fitting the young minds in his charge to cope with the problems which the introduction of this new force is bringing to the social order.

It was with the full realization of the duty that the electric light and power industry owes to those whom it serves, that they should be able to secure from authoritative sources accurate information on our business, that the co-operation with educational institutions committee was established. For let it be said here that our obligation to the public does not end with the furnishing of an ample supply of electric energy at the entrance switch to the house or factory, but we owe the public the duty of seeing to it that the information given to the youth of our land is accurate, current and in keeping with the facts.

Most of the co-operation that had hitherto existed between educational institutions on the one hand and electric light and power companies on the other had its inception in the eagerness of educators to gather from electric light and power companies the facts needed by them for proper presentation of the industry's place in the modern scheme of things.

In too many instances electric light and power companies are yet unmindful of their obligation, not only to those of our own time but to those who shall follow, and are indifferent to the justice of the request of the educator and to the importance to the industry and to the public of complying with his request. I believe it to be the duty of those engaged in the electric light and power industry, when they realize that institutions of higher learning are not being adequately supplied with facts relative to our business, to take the initiative in seeing that such contacts are made as will warrant educators in believing that they can secure accurate information about the financing and operation of electric light and power companies.

Any business, if built on a lasting foundation, must have the confidence of those whom it essays to serve. To gain this confidence and hold it, the organization must deserve it. A business can deserve it only by adopting as a policy in the transaction of its business the old-fashioned virtues of honesty, fair dealing, straightforwardness and a willingness at all times to give fully and freely information of any kind and character pertaining to its business.

Particularly in the utility business is confidence the basis of any sound and lasting prosperity.

As one studies the progress of the human race and the development of society, he is convinced that no movement that has made for social progress has long lasted unless it had as its motivating force a conscious purpose to make of the movement something beneficial to those whom it would serve.

Continuance of Information Bureaus Up to Local Companies

In the main, the information bureaus have served a very useful purpose, and through their operation has been set up a source of information which the recognized media for the dissemination of facts have found to be authoritative and helpful. Newspapers have, in the past, come to lean on these bureaus for news that to them appeared timely relative to the progress and growth of the companies in their state. Speakers and writers have found the information furnished by these bureaus timely and accurate.

Since the establishment of the information bureaus, however, mergers and consolidations have eliminated many of the smaller companies, making it possible for the units so formed to maintain, as a part of their personnel, experts in the matter of assembling and distributing information relative to the operation or financing of the companies. For this reason, there has grown up in the minds of some a feeling that the usefulness of the information bureaus has passed and that their functions can well, and perhaps better, be taken over by the operating companies themselves, which, after all, are charged with the responsibility of seeing to it that full and accurate information is obtainable by and given to their customers.

The question of the continuance of these information bureaus is food for thought, but it is felt that the solution lies with the individual companies within the states maintaining bureaus.

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Business is but one branch of our social order. But lasting business, like any other function of society, must have as its objective a beneficial influence on the race.

Our industry has within itself inherently those qualities which, if honestly applied to the service of mankind, should and will insure its stability and its lasting prosperity.

Our task is made the more difficult because we are, by the very nature of our industry, a monopoly. The lengths to which men have gone to free themselves of monopolistic power have demonstrated the fact that men do not readily give up the right to pick and choose of their own free will those upon whom they would bestow their patronage. We therefore have a handicap in obtaining and retaining public good will not encountered by those engaged in businesses which are by their nature competitive.

The industry has been successful in applying the laws of nature and the products of inventive genius to our problems. We have won the confidence of the leaders

T. A. Kenney
Chairman
Information Bureau
Organizations Committee

Homer E. Niesz
Chairman Industrial
Relations Committee

Miss Sophia Malicki
Chairman
Women's Committee

Carl D. Jackson
Chairman Co-operation with
Educational Institutions
Committee

of the financial world. This is much, but it is not enough. Our future depends upon the degree to which we can obtain and retain the confidence of those who, in the last analysis, are the makers or unmakers of business and government, "the folks back home."

Years ago the immortal Pope said: "The proper study of mankind is man." What a world of philosophy, what a treatise on all human relationship is bound up in this short, terse sentence!

After all, it is not enough that we conduct our business with honesty of purpose, with an unselfish desire first of all to give to our customers the full measure of service, beaten down and running over, but that our customers must know and feel within their inner being that we are honest. In short, they must believe in us. This is my reason for saying that, in the end, public relations begin and end within our own organization.

Selection of Human Element All Important

We have been very careful in the selection of the mechanical equipment that enters into our business. We have employed every known test to determine its fitness for the job. But have we been as careful in the selection of the human element, chosen to interpret our business and the organization we have set up, to the public? In the end, the public will think of us as they think of the men and women whom we have associated with us as the interpreters of our business to those intimate circles with whom these men and women come in contact.

The industrial relations committee has been formed for the purpose of giving to this all-important phase of our business the intensive study which we have hitherto given to the mechanical aspects of the business. No man or woman should be selected for a position in an electric light and power organization until, at least, every known test by which his fitness for the job and the determination of whether or not he possesses the qualifications to assume greater responsibility has been applied. This is not enough. He must be so informed about the business in which he is engaged that he can properly and adequately interpret this business to his neighbors and friends, and I am of the belief that to the extent that he goes beyond the sphere of his ordinary activity to extend opportunities for this interpretation to that extent does he merit recognition and advancement. Nor yet is this sufficient. In the mechanical field we are wont to test from time to time the condition of the equipment employed properly to discharge its functions. What about the human element of our business? Are we concerned about the conditions under which the men and women employed in our industry work, and do we go beyond the hours of employment and learn of the stresses and strains that may sap their mental energies and may impair their fitness for the job? In too many instances, I fear not.

When we have given at least as much attention, care, thought and study to the human element of our business as we have given and are giving to our mechanical equipment, then, and not until then, shall we have the right to expect our employees enthusiastically to help us build our organization into, and a part of, public confidence and good will.

T. J. McManis
Chairman Manufacturers'
Advertising Committee

W. S. Vivian
Chairman Public Speaking
Committee

W. H. Hodge
Chairman Customer
Ownership Committee

A. W. Robertson
Chairman Relations with
Financial Institutions

The customer ownership committee brings to the industry a very definite recommendation. On the theory that our responsibility to our stockholders does not end with the acceptance by them of our securities; on the theory that the good name of the industry is something of which we should be most jealous, the customer ownership committee feels that there should be some sort of impartial tribunal to which men and women who have purchased our stock and are offered in exchange therefor other securities known to us to be of doubtful value may appeal, with a consciousness that they shall secure an unprejudiced verdict. Therefore, the customer ownership committee recommends co-operation on the part of electric light and power companies with the better business bureaus of the nation. These bureaus are doing a great work. They have the facilities for impartial investigation. They should be supported.

The public speaking committee has had a remarkable year of achievement. More talks by employees about our business, in an unselfish effort to interpret it to the public, have been made this year than ever before. But the important phase of this public speaking program is not the number of talks that have been made, but that "something" which, once an employee has been able to give expression to the thoughts that are in him, wells up in him and makes of him a different man. As a method of employee training I commend to the electric light and power companies of the country public speaking.

Our relations with financial institutions were never better. We enjoy the confidence of the investing public.

What the Women Are Doing

I cannot close this report without paying a tribute to the marvelous spirit that has been developed among the women of our industry through the activities of the women's committee. Co-operating, as it has, in that most estimable of all recent departures, the home service movement; pointing the way, as its leaders have done, to the women of the industry to enlarge their opportunities for service and to broaden their sphere of activity; encouraging, as this committee has, our women to know their organization, to know its policies and its hopes, and, knowing, to interpret these policies to the women of the nation, this committee has made a lasting contribution to the industry.

The accomplishments of the past are but an index to what the accomplishments of the future may be. Our industry will continue to be a constructive force in the life of the nation only as we deserve it. It will be stable only as we are right. Being right, as I believe the industry is, as nearly as it is possible for any human agency to be right, let us not hesitate to continue to give to those for whom we are trustees of a very important service an account of our stewardship. Let us continue to fight for what we believe to be in the best interest of the American people. Let us not stoop to pettiness. Let us not sully our great industry by deeds that will not bear the searching light of day. The record of our accomplishments reveals a contribution to society and the race too valuable to need anything but straightforwardness to insure the lasting prosperity of the electrical industry.

Beam of Light Transmits Photographs and Messages

ONE of the interesting exhibits at the Convention was the transmission of photographs and messages through space by a beam of light. This beam of light forms the only connection between a facsimile transmitter and receiver, which by electrolytic process reproduces transmitted images. The device is the latest development of Dr. Vladimir Zworykin, research scientist of the Westinghouse Electric & Manufacturing Company.

The extent to which Dr. Zworykin has developed his device reveals an entirely new step in fac-simile transmission. In the devices previously demonstrated photographic development was necessary after the transmission had been completed. With the new receiver the transmitted image is produced without further developing so that an onlooker may see the image being formed at the receiving end.

Vice-President Curtis Says:

Honor Edison Now

"THE greatest honor we can confer on Mr. Edison is to recognize him not after death but now, during his lifetime, as a patriot, as one of our greatest public-spirited citizens, one who has abundantly proved his love of country, one who has indeed zealously guarded and advanced its welfare.

"It is customary to think of patriots and patriotism in terms of war-time service to the country. Peace-time service is taken as a matter of course, and not generally thought of as such. Yet it is more truly so, for it is done without the glamour and pomp of war, without the fever which takes us out of and beyond ourselves when battle is impending and present and spurs us to glorious sacrifice.

"The record of Mr. Edison's services, both peace-time and war-time, undoubtedly entitles him him to rank among our greatest patriots. In him we have a man whose every action speaks louder than can any words of his love for his country and zealous guarding of its welfare and the welfare of its people; not only of our own people but of all mankind. He has devoted his entire life to experiment and research; to probing, trying, testing, retesting and perfecting inventions of paramount and far-reaching benefit. If there is such a thing as a super-patriot, he is that."

The Inspiration of a Name

By CHARLES L. EDGAR
President Edison Electric Illuminating Company of Boston

THE pages of history are illuminated with the names of persons who have attained renown through some distinguished service for the welfare of mankind. They have devoted their individual efforts to a cause which was dear to the hearts of their fellowmen. Many of these persons, as in the case of Washington and of Lincoln, dedicated themselves to the preservation and upbuilding of their country, while others were inspired to action not by love of country but through their consecration to religion.

Contrast with these others who have used their talents in an attempt to break down and destroy civilization. These are the Cæsars and the Napoleons, warriors who have risen to fame as the conquerors of hostile nations, rulers who have reared vast empires to satisfy their ambition and lust for power. The former type, working for the upbuilding of some lofty principle, and the latter, disrupting the order of the world to satisfy their selfish desires, have all obtained the plaudits of the multitude. In almost every case they had been working for a cause, whether it had for its object creation, preservation or destruction.

Another group includes those persons who have risen to fame through accomplishments which were the result of a thought or an idea originating in each inner consciousness. They were not called to preserve existing conditions, to introduce reforms or to advance the interests of the church or state. They were pure individualists who assumed their tasks, not in response to a popular demand for a leader to accomplish some desired result, but inspired only by their own visions. They had a conviction that there was some specific object which they could accomplish and they carried their work to a successful conclusion without outside advice or assistance.

But it remained for Edison to discover the source from which at his magic touch was created a new sun for a new world, dispelling darkness and bringing added comfort into the homes and revolutionizing the life and methods of a grateful world. For him nature revealed her hidden secrets and through him a new industry sprang into being.

While we have been amazed at the volume of his achievements and spellbound by his energy and perseverance, we have been especially touched by the warmth of his affection. Though he may be acclaimed a leading scientist and inventor, though he may be pointed out as the highest type of American citizen, those of us who know him best will ever proclaim him, above all, a stanch and faithful friend. Always modest and of a retiring nature, he has not desired fame or honors, although his fellowmen have praised him for his integrity of character, have honored him for his achievements and loved him for his self-sacrificing regard for others. Throughout his whole life no labor was too great to be undertaken for the accomplishment of a purpose when once his mind was determined to pursue it.

Charles L. Edgar

Truly his life is a life of service, and we of the utility industry, whose basic principle is service, find in his life and work an example which it is an honor to follow. When confronted with a problem the solution of which taxes our utmost powers we may be encouraged to persevere when we remember how Edison conquered the apparently unattainable by dint of hard work, untiring zeal and unlimited perseverance. While we credit Edison with a remarkable degree of genius, we have his own modest testimony that much that he has accomplished has been due to hard work and perseverance, and though we lack the natural powers which he possesses we may be inspired by his example to accomplish much in the world if we apply ourselves to the tasks which are ours with his determination and his willingness to labor.

To follow is the lot of the multitude; to lead is the privilege and responsibility of the master mind who dares to stand alone, if necessary, while adhering to the principles which he believes to be sound and logical. Edison has blazed the trail through unknown wilds while others looked on with unbelief. His was the task to lead the way, and, true to his high calling, he emerged with the fruits of victory amid the plaudits of those who had been unbelievers.

Like Edison, our lives should be dedicated to the service of mankind, and I believe that like him we are endeavoring to meet our obligations with cheerfulness and earnestness and a desire to accomplish the greatest good to the largest number.

In looking back to review the wonderful results which he has accomplished during his fourscore years we are again astounded that this man of mature years, but

still young in mental capacity and in resourcefulness, has within very recent years taken up a new line of endeavor and, we have every reason to believe, is about to bring to a successful conclusion an important development in one of the leading commercial industries of our times. Apparently there is no limit to his possibilities, and we may confidently expect that as added years shall yield their opportunities he will continue to carry on for the good of humanity, and when those of us who know him intimately and are inspired by his personality shall have faded from memory the name of Edison will still live and grow with the years, an inspiration to the sons and daughters of every tongue and every nation who see the light and render thanks to him who invented it.

While all of us, engaged in the public utility business, are proud of our industry and really feel and believe that it is one of the most important as well as interesting businesses in the world, I want you to realize that there are some of us, perhaps few in number, who have a deeper feeling than that felt by the greater majority. It is a feeling of pride, experienced not so much on account of what Mr. Edison himself has done as for what he has inspired us to do. I do not think that anyone could have been associated with him for a generation and not be influenced, perhaps unconsciously, by the spirit which has actuated him. Personally, I feel like bowing my head and being thankful that my good fortune has enabled me to live my life in the atmosphere he has created and under the inspiration of his name.

Paul S. Clapp

Federal Investigation Discussed

By PAUL S. CLAPP
Managing Director N.E.L.A.

DURING the year the National Electric Light Association has been under intensive federal investigation. In accordance with the policy indicated by the officers of the association, our attitude has been one of complete co-operation with the government. Various representatives of the Federal Trade Commission have made repeated visits of varying lengths to our headquarters offices. All accounts reaching back ten years have been scrutinized in detail several times and each voucher has been critically reviewed. Indices of the complete files were furnished and investigators were given prompt and complete access to every file requested. Requests for specific information and voluminous copies of material were complied with. Members of the staff have testified in Washington frankly, completely and often.

There has not been an expenditure, an action, a single phase of activity of the association which has not been exposed to the searchlight of microscopic analysis. The investigation has been thorough, even painstakingly and carefully done, as governmental investigations must be.

The association assumes full responsibility for the accuracy and truthfulness of the information it makes available. We realize our obligation that only real facts and correct interpretation be given. Mistakes and errors may occur, but every effort is made to prevent and correct them. Your statistical research organization has been developed until it is among the best maintained by any basic industry. The statements and publicity of the association are made from this background of factual information, widely gathered, critically analyzed and competently interpreted. Our objective is to make facts available, confident that they will speak for themselves in securing for the electric light and power industry a fuller public understanding of its problems, accomplishments and services.

Better Home Life Within Reach

HOME management is being greatly aided by electricity, declared Miss Lita Bane of the University of Wisconsin, past-president of the American Home Economics Association, in an address before the Public Relations section on Thursday. The speaker maintained that the present major field of electric service in the home is in adequate and attractive lighting and in power applications which enable women to mechanize, standardize and routinize frequently recurring and uninteresting tasks. The need of inexpensive indirect lighting, especially for living rooms, was stressed, and Miss Bane pointed out the importance from the home-maker's standpoint of low-priced electrical service and machinery for household use.

Closer study of the needs of home managers should be made in order to avoid waste of money and effort in producing useless tools. Women should be offered careful training in the use, care and simple repair of household equipment. Budget straining should not be encouraged in order to multiply unduly the apparatus of the home, but where the economic situation is pressing, the value of electric service in enabling the housewife to undertake other productive work, as gardening and dairying on the farm, should be weighed. On the esthetic side, electricity is doing much to make the home more attractive as a place of rest and satisfaction.

Edison's Achievements

The Basis of an Industry

Wizard's versatility has led to today's achievements. Benefits outstrip monetary measure of electrical business. A public trust that will not be betrayed

By THOMAS N. McCARTER
President Public Service Corporation of New Jersey

Thomas N. McCarter

BECAUSE Thomas A. Edison has been a resident of the state during the period of his greatest scientific and inventive activity, we of New Jersey claim the great inventor as the most illustrious of our citizens, and as one group of New Jersey names—Trenton, Princeton, Monmouth, Morristown—call to the minds of all Americans the memory of Washington and his heroic struggle for independence, so other New Jersey names will be forever associated with Mr. Edison and his many epoch-making inventions and discoveries.

In Newark he perfected his improvements in telegraphy, assisted in the production of the first successful typewriter and discovered the phenomena which later became the basis for the development of wireless telegraphy; in Menlo Park he produced the carbon telephone transmitter, including the microphone, the phonograph, the incandescent lamp, gave commercial possibility to the generation and distribution of electricity, and accomplished other wonders; in Harrison he established the first commercial electric lamp factory, and at West Orange, he gave to the world the motion picture camera, one of the best of storage batteries, and is still actively at work, mentally and physically capable of further great discoveries and inventions.

And so, speaking for New Jersey, I add the tribute of his fellow Jerseymen to that great volume of acclaim with which the people of the entire world mark this anniversary—not merely of an accomplishment but of a man.

At every recital of the inventions of Mr. Edison I am astounded at the number of what are now great industries in the development of which those inventions played an important part. Telegraphy, telephony, wireless, radio, motion pictures, electric rail transportation, electric light and power, and so on through the long list, each has been stimulated, each has profited, each has been bettered by some product or products of his almost universal genius. When we consider the remarkable diversity, the remarkable quality and the remarkable quantity of his laboratory output we can better understand why he has considered that, for himself at least, a twenty-hour working day is not too long.

We of the electric light and power industry owe to Mr. Edison much more than is involved in the discovery of a practical incandescent lamp, important as that discovery was. We owe to him the very basis of our industry. He gave to us the first practical commercial central station and he developed for us the first practical method of generating and distributing electrical energy. From the abstract he produced the concrete; from theory he educed practice; by the magic of his mentality he converted scientific speculation into practical accomplishment, and upon the foundation that he laid has been reared the great struture of an industry that today plays so great a part in the economic and social life of this nation.

The most important fact is not that the comparatively few thousand dollars that went into the construction of the Pearl Street station have grown into an investment throughout the country of more than ten billion dollars; it is that the development of electric service since that day in October of 1879, when Mr. Edison perfected his incandescent lamp has brought added prosperity to American citizens, has revolutionized American industry and has increased immeasurably the comfort and convenience of American homes.

It is in terms of benefits conferred upon the people —not in terms of kilowatt-hours and dollars—that the astounding results of the discoveries and inventions of Mr. Edison and the many other scientists and engineers who have played their part in electrical development, along with far-visioned financiers and executives, may best be recorded.

Even in the realm of statistics, we draw too dim a picture when we attempt to show what the industry has created in the way of wealth by a recital of figures show-

ing investment in the industry alone. Vast as are these totals, they are small beside the figures of wealth which electrical service has built up for the nation, in trade, in industry, in transportation and in our other activities.

Electric service has helped to make our great cities possible; it has given them light and power, without which their present character would have been impossible. It has provided for them rapid transit necessary to their existence, and it has changed for the better the habit of living of their people.

Electric service has played an outstanding part in the development of our suburban communities, giving to their inhabitants those comforts and conveniences which, added to their natural advantages, have attracted thousands to new and better conditions of existence.

Electric service extended to our rural communities is bringing to thousands of farms not only increased economy and efficiency in agricultural methods but improved conditions in their domestic establishments.

Electric service in industry has permitted improvements in methods of production which have made this nation today the most prosperous in history.

Electric service in transportation, although it has created a system of local and interurban transportation that performs a major function in the upbuilding of our commonwealths, is but at the beginning of its full usefulness, as is demonstrated by the increasing trend toward steam railroad electrification. And in many other fields and in many other ways electric service has increased national wealth, has accelerated national prosperity and added to national resources.

Among the millions of our population, there is not an individual whose oportunities for a better, a broader, a more satisfying existence have not been multiplied because Mr. Edison started the electrical industry along the road to practical development and progress, and because men were found to continue that development and to bring to fruition the seeds that he planted.

There are a thousand functions that electricity now performs for us that in the days of our fathers involved hard manual labor and an expenditure of time that made working hours long and playtime short, and there is no better way to secure a realization of the changes that electrical development has wrought than to review one's personal activities during even a single day and note how they are affected by the various applications of electrical energy to our needs.

When we consider the electrical industry in the light of what it has accomplished, when we reckon the blessings that it has so universally conferred, when we contemplate the wide range of its activities, intimately affecting, as they do, so great a majority of our people, we cease to wonder at the giant growth to which it has attained and to marvel at the magnitude of its financial and physical operations. No industry of lesser size could possibly have accomplished what it has accomplished. No organization of smaller scope could perform the service which it performs.

It was not enough that Mr. Edison should have perfected an incandescent lamp—should have put in operation the Pearl Street station. Unless there had been scientists to devote their lives to laboratory and mathematical research, unless there had been inventors to apply the abstract principles thus discovered to practical utilization, unless there had been business men with vision wide enough and with optimism strong enough to foresee the commercial possibilities that lay ahead, we would still be living in the age of our fathers and the economic and social progress of the past 50 years would not have taken place.

The whole world glories in the achievements of that long list of men of science who have contributed to our knowledge of the natural laws that govern electricity; it is not slow to pay its tribute to the inventive genius that has given practical effect to those laws in the application of electrical energy to the requirements of mankind, and the time is coming, I believe, when it will recognize the service which has been performed in its behalf by those who instituted, who have built up, expanded and improved the great industrial organizations which placed at the command and within the means of so large a number of our people the benefits which the scientists, the inventors and the engineers have created.

They have been pioneers in the field of economics and of business; they have discovered new laws and new principles governing the operations which they conducted and have not hesitated to apply them to promote public welfare; they have not failed to recognize the close alliance between science and business and have been more than liberal in contributions which permitted research and experimentation on a scale known to no other industry; they have readily accepted as an essential contribution to development the heavy charges for obsolescence which the progress of electrical science entailed.

A Public Trust Imposed

With the record of the electric industry in mind, I have no fear of the future. It was conceived and has been developed as a private undertaking. Without the initiative, without the enterprise, that comes with private as opposed to governmental operation, it would never have reached its present stage of usefulness. No government would, or should, have taken the risks, have incurred the expenses, have suffered the losses, that were necessary to its growth and expansion, and the time has not yet come, nor is it in sight, when the industry can successfully function without the same application of initiative and enterprise to its affairs. The industry has new fields to conquer, new realms to explore and new services to perform. When we stop to think that its basic purpose is to provide energy—power—wherever and for whatever purpose energy and power are needed, we must realize that, however great has been its accomplishment in the past, the extension and expansion that is to come will be immeasurably greater.

Upon the industry from its beginning has been imposed a public trust, which has become greater as its activities and usefulness have expanded and which will continue to increase through the coming years as the essentiality of its service increases.

There has been no betrayal of that trust in the past, and upon the members of the National Electric Light Association—executives, engineers and all of us—devolves the duty of seeing to it that there is no betrayal in the future. We have still a great work to perform, and the inspiration that we draw from the achievements of our pioneers like Mr. Edison, to whom our heartfelt expressions of gratitude and appreciation go out today, will be with us in our onward march toward the goal of greater accomplishment.

Six Vital Problems

for Accountants to Solve

W. Alton Jones

It is contended that utility accounting departments are overlooking an opportunity to be of far greater service by failure to enlarge scope of activities. Six ways are suggested.

By W. Alton Jones
Vice-President Cities Service Company

THE period has long since passed when the successful business executive can afford to spend much time in a long perusal of the accomplishments of past years. The accomplishments of the last decade, the last year or the last month are of interest to the executive, but not of primary importance in the conduct of his business. He is vastly more interested in knowing what it will cost him to serve his customers next year and the year after and at what rates he can hope to meet competition, hold his present customers and attach new business.

If you agree with me that the modern business executive is more interested in the determination of future costs than in the perusal of old records of performance, I would like to invite your attention to the consideration of a question the answer to which rests largely in your hands and which, in my opinion, is of the greatest importance to light and power executives everywhere. This question is, How can the accountant better serve the light and power industry?

Need Facts That Will Avoid Erroneous Conclusions

The Federal Trade Commission is now conducting a searching investigation of the light and power business to determine whether it should be controlled or regulated by some agency of the federal government. Whether federal regulation of the light and power industry would be good or bad for the public is a broad question of public policy on which there is a wide difference of opinion. The facts are that this industry is confronted with an examination, and before this examination is finished light and power companies everywhere will be required to answer many questions about their business.

So far as I know, there is no disposition on the part of the light and power companies anywhere to refuse to disclose pertinent facts about their business to bodies duly authorized to examine into the facts. But there is concern in many places for fear that incomplete facts gathered here and there about certain phases of our business may lead to erroneous conclusions and may have a far-reaching effect on the minds of those men charged with determining whether or not there should be federal legislation looking to its regulation.

Therefore there is confronting the accountants of this industry the grave responsibility of seeing to it that in the course of this federal investigation such facts as are required of us be presented in such a manner as not to lead to hasty or improper conclusions on the part of those who will be called upon to consider them and who may be less familiar with our business than they should be.

Whatever may become of this present investigation, the light and power industry will always be subjected to some form of regulation by municipality or state. Fair regulation without intelligent information is impossible. I realize that the committee on uniform classification of accounts has done much effective work toward standardizing report forms for various state commissions, but reorganization of the committee along broader lines to the end that the member companies may be able to get better advice is necessary.

Accounting Aspects of Interconnection

The interconnection of large power systems throughout the country has now reached the point where it touches hundreds of communites and involves the purchase and sale of electrical energy between various companies. Each year will see more and more of these interconnection agreements in the interest of greater economies and better service to the public.

This work would move forward much more rapidly if the accountants of this industry were more conversant with this problem. Here is a case where the engineer and the accountant should work very closely together. Often failure to interconnect one system with another, or an isolated plant with a large power line, is due to improper allocation of costs. I would commend this question for your consideration, as one of very great importance.

There are still some people who hold to the opinion that the public utility business is non-competitive. This was never true. Approximately 61 per cent of the electrical energy sold in this country is sold for power purposes. Much of this energy is sold in direct competition with other forms of power, such as steam, the Diesel engine, natural gas, etc. Many of the individual power customers of our electric companies are so large they are fully able to finance the cost of a private power plant when they are unable to get better service at lower costs from the light and power companies.

Only the great economies effected by the installation of large and highly efficient generating units have made it possible for our companies to hold some of their most valuable business. With the advent of improved Diesel engines power companies everywhere are further threatened with the loss of business.

In many instances the determining factor in holding a power customer is the proper determination of his own over-all costs of manufacturing power. The accountants of this industry could render a very valuable service if they would give further attention to the matter of the proper determination of service costs for isolated plants. Some people may hold that this takes the light and power accountant outside of his own sphere, but I feel that any study of this kind that will throw additional light on this important subject is the public utility accountant's job.

Analysis of Distribution Costs Needed

America is known the world over for mass production, and with this mass production in recent years has come lower unit production costs. No other industry has shown greater improvement in production efficiency than has the light and power industry. In fact, the point has been reached in some cases where the production cost of our product is negligible. Much of this improved efficiency has come about through new inventions and new and improved processes and equipment.

However, little or no progress has been made in reducing the cost of distribution. We do not differ from other industries in this respect and, if we carefully analyze the family budget of the average American home, we will find that a large part of the cost of living is made up of distribution costs. All industry is directing its attention to a more careful scrutiny of this problem.

It is of vital importance that the light and power companies give this matter more serious consideration. In order that we may intelligently approach this problem, a more careful analysis of distribution costs is necessary. This problem is decidedly one for our light and power accountants to handle.

There are also large savings to be effected in what we term in this business "customer's expenses," which for the most part fall under the direct supervision of the accounting executives of the various companies.

Formulation of Rate Structures Requires Cost Analyses

There was a time when the public utilities had a reputation for charging "all the traffic would bear." It may be that the industry earned that reputation, but few public utility executives are interested in this question today. They are more often interested in the question of how cheaply they can sell their service and still make a reasonable return. The most progressive light and power executive today realizes that our greatest ultimate success depends upon the widest economic use of our service.

In the intensive development of business the light and power companies in many parts of the country are introducing promotional rates, rates for off-peak load, preferential rates for high-load-factor business, etc. All of these departures in the development of business require the most careful cost analysis. If our commercial departments are to be properly guided in attaching to our lines business that can be economically served, we must know more about the cost of various classes of service. This, again, is an accounting job and, while it needs engineering interpretation, you are the men who will have to marshal most of the facts with which to solve the problem.

Facts Combat Unsound Argument

While this country has made the greatest progress of any nation in the world under the rule of private initiative in business, there are still many people to be found in this country who believe that we would have made even greater progress under government ownership. And, what is more to the point, many people throughout the country are openly advocating the political ownership of the light and power business.

If our commercial departments are to be properly guided in attaching to our lines business that can be economically served, we must know more about the cost of various classes of service.

Some able men who have studied this problem contend that back of this movement are the leaders of communistic thought; other people hold that our socialists are responsible for this doctrine of the "government in business." But I am satisfied that there are some people who, listening to these doctrines and being sincerely impressed by them, would immediately desert such doctrines if they had a better understanding of the economics involved in government ownership.

Many successful politicians are gifted orators, and, often unhampered by facts, they are able to sway public opinion in favor of unsound doctrines. In the end, however, one who pleads at the bar of public opinion in this country must use facts and not fancies.

There is enough factual information available to prove to almost any open-minded American citizen that the government should keep out of all lines of business, but far too little real factual information about this subject has been presented to the American public. Too many of the people who oppose government ownership deal in glowing generalities and do not marshal the most effective arguments against it. Here is another problem which may properly commend itself to your attention.

Some may say that much of what I have said has more to do with economics, engineering and management than with accounting. But to those I would answer "Lift up your eyes," for the accountant who wishes to serve his industry best must better view the problems which confront us if he is to aid in their solution.

Gala Effects at Atlantic City

Open Light's Golden Jubilee

Golden highway lamps, jeweled arches, lamp festoons, mobile color lighting, illuminated fountains, colored scintillators and pattern lighting on building exteriors add to seashore resort's already notable lighting display

MILES away from town, the convention visitor to Atlantic City became "light conscious" when approaching the famous resort by twilight. Slanting fingers of searchlights pointed heavenward and swept the darkening zenith in endless quest; long lines of golden highway lamps converged in brilliant perspective upon the city by the sea; distant floodlights tinted the eastern horizon, amid the outlined towers and battlements of massive hostelries, and the rays of beacons placed high for the benefit of aviators added their contribution to the luminous overture. Soon the western end of the immense new Auditorium rose among its neighbors; the train passed the "Welcome" display of the Atlantic City Electric Company, bidding its arriving brethren of the power industry to make themselves at home, and came to a stop almost under the tower of the City Hall, impressively illuminated to celebrate the diamond anniversary of the municipality and the Golden Jubilee of Light.

Arch of Jewels and Golden Showers Decorate Boardwalk

The visitor who decided to walk to his hotel had a treat in store. On Atlantic Avenue, north and south as far as the eye could reach, street and window lighting poured forth a pleasing effulgence. From every street-lighting unit a graceful festoon of incandescent lamps was looped across the sidewalk to the nearest building wall. The national colors waved joyfully in the evening breeze from every post. Turning northward, the pedestrian passed shop after shop whose owners had left every light in service to gladden the occasion, and at the intersecting streets leading toward the Boardwalk many examples of outline lighting could be seen among even the caravansaries, which thus tried to do their part in recognizing the indebtedness of mankind to Mr. Edison and their pleasure in Atlantic City's progress. Here and there a portrait of the great inventor might be seen bordered with small lamps or set in the path of a well-trained floodlight unit or group.

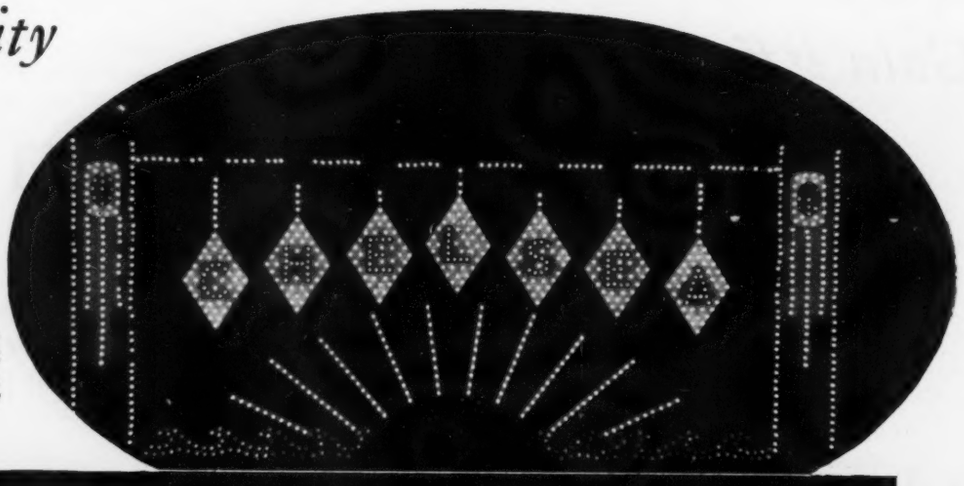
At States Avenue the visitor caught an end view of a splendid arch of light erected to span the Boardwalk in honor of the jubilee. Proceeding a block or two further, he swung sharply to the east and in a few moments found himself standing on the famous footway, bordered by the thundering surf and sandy beach on the left and the apparently endless row of stores and amusement establishments on the right. Lifting his eyes toward the south he beheld an arch sparkling in the rays of 36 high-powered searchlights and containing 25,000 glass "Novagems," making a truly gorgeous spectacle. This arch, 60 ft. wide and with towers 57 ft. high, shone up and down the Boardwalk for a long distance and caused the visitor to turn back more than once as he passed on toward his destination.

Along the Boardwalk the regular illumination, no mean example of display lighting, was heightened by impressive outlined applique and flood lighting. It would be invidious to discriminate between installations, but here and there a great architectural pile, like the Traymore, Blenheim and Ritz, was tastefully conspicuous in its effective use of colored floodlights, disposed to bring out the warm tints of a group of upper towers, enabling the thousands of passersby to enjoy color tones by night hitherto revealed only by daylight. At one point the changing rays of a large electric fountain illumined by a battery of 30 submerged floodlight projectors, each equipped with five color screens and a 1,000-watt lamp, produced a beautiful spectacle. No less than 72 different effects were obtained by automatic light changes and variations in the height and shape of the water jets. Offshore, at the end of Young's Pier, for so many years the home of the N.E.L.A. conventions, but now abandoned for the Auditorium, the monogram of a leading electrical manufacturer blazed into the night and spread a luminous path across the ceaseless waves breaking against the shore in a million facets of light and spray. Back and forth over this scene swept the penetrating beams of seven searchlights mounted far out on the pier, while blending colors and waving streamers of light shot upward and across the city as if to tell the world that Creation's first commandment had once again been obeyed. And so on to the Auditorium.

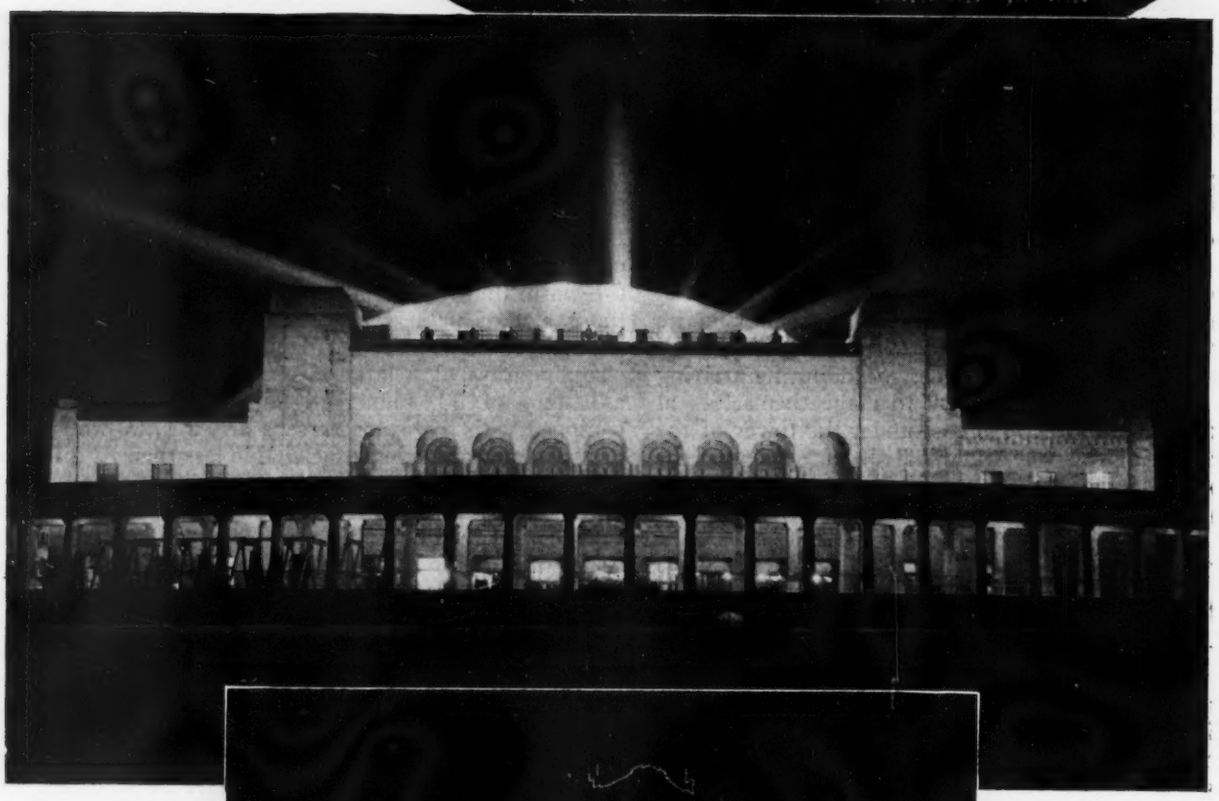
Auditorium Illumination an Impressive Sight

Before this mighty building the visitor paused to rejoice. Opposite its eastern façade and on the edge of the beach stands a curving colonnade, forming a permanent setting for 112 superb floodlights screened in blue, red and orange and mounted to throw their full power upon the front of the great structure. Here classic beauty has been combined with utilitarian service and mechanism employed to vary the coloring in striking and pleasing ways. Additional floodlighting on the Auditorium roof and an interior display of amazing flexibility, modern to the last outlet and an indispensable tool in the permanent service of this great building, gave convincing evidence that a new era in decorative and utilitarian lighting has been attained through the efforts of the illuminating engineer and the foresight of organized endeavor. In a real sense the display reached a fitting climax in the Auditorium, Atlantic City's new home of mighty gatherings for purposes diverse as human progress itself.

Atlantic City Put on Robes of Light



Arch in hotel garden composed of pattern and strip lighting



112 searchlamps with color screens vary illumination of auditorium façade while images of nine arc tails are projected in color below arched roof

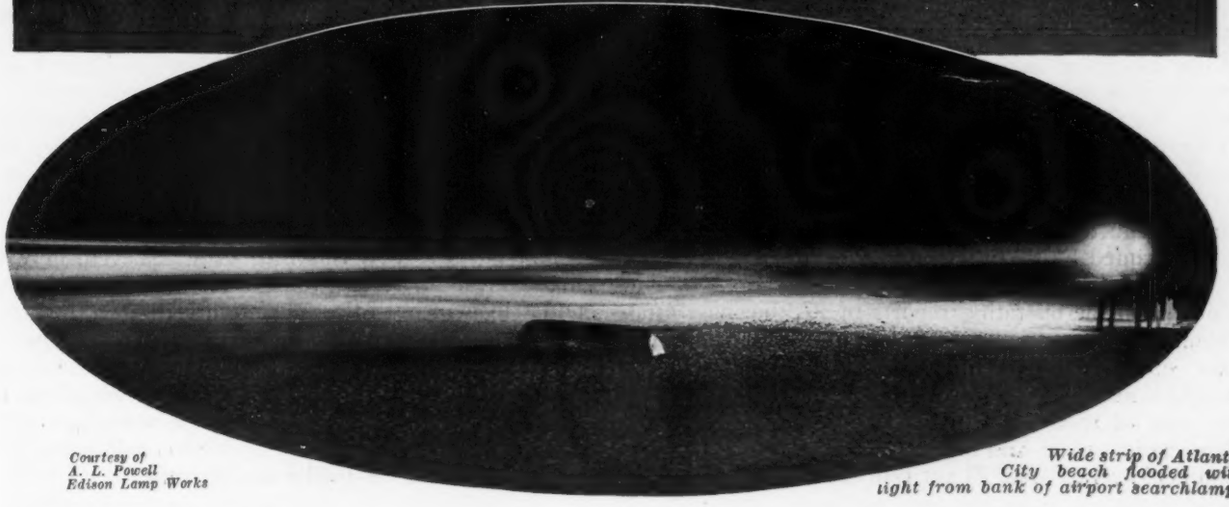
Courtesy of A. L. Powell Edison Lamp Works

Illuminated patterns and festoons decorated the Ambassador Hotel

Exhibits, Hotels and Even the Beach Glowed with Color

Another example of decorative illumination produced by applique and strip lighting

Dennis and Shelbourne Hotels utilize same motif in decorating balconies



Courtesy of A. L. Powell Edison Lamp Works

Wide strip of Atlantic City beach flooded with light from bank of airport searchlamps

Soundness of
Regulation Proved

Has protected the public in every situation and yet allowed utility companies to adapt themselves to violent economic changes

By W. J. HAGENAH

Vice-President Byllesby Engineering & Management Corporation

W. J. Hagenah

THE cost of producing and distributing electrical energy has been greatly reduced; but the savings have been transmitted to the public through the constant downward revision of rates, for at no time have the state regulatory commissions permitted rates that yielded an unreasonable return on the fair value.

During this same period private industry, limited only by the restraints of competitive business, not only advanced prices violently, but has generally maintained them at a level far in excess of pre-war prices. The principles of regulation that have governed utility operations over the last twenty years were never applied here. When mounting costs and the consequent declining purchasing power of the dollar of income destroyed pre-war bases, the utilities were compelled to ask for relief, but never did the total of the increases granted bring the residence electric rates back to the level that obtained in 1913. Even by 1920 the entire increase had been wiped out by reductions ordered by the commissions or voluntarily granted by the utilities.

Statistics compiled by the National City Bank of New York from the operating reports of 772 business establishments representing 31 different industries are significant on the subject of comparative earnings. The weighted average year's profit of these enterprises was 14 per cent of their net worth, after paying all expenses, depreciation, taxes and interest. The profits in the aviation field average over 34 per cent; they were 28 per cent in the automobile business, 24 per cent in the drug and sundry business, 23 per cent in the printing and publishing business and over 21 per cent in the manufacture of automobile accessories.

Compare these earnings with the returns computed on the same basis for the leading electric and combined electric and gas utilities in 1927. Such a study covering 30 properties with an aggregate book cost of $4,143,000,000 showed profits on the combined capital stock and surplus, after provision for depreciation, taxes and bond interest, of 9.16 per cent. This percentage is, however, misleading, because the capital structures and fixed charges of the various industries differ materially. Further, private industry sets aside reserves not allowable for electric utilities under commission practice, and in the private industries embraced in the above study were many companies having little or no funded debt charge. The above average profit of 14 per cent in private industry, therefore, represents the return on a much larger proportion of the total investment than is true for utilities. Were the industrial net profits related to a smaller share capital, as is found in utility capital structures, the corresponding earnings of manufacturing and merchandising corporations would be nearer 20 per cent. The measure of return for regulated utilities can only be correctly expressed by relating the above 9.15 per cent to the fair value of the entire property.

In conclusion, regulation of utilities by commissions has successfully met every test of the soundness of its policies, and utility laws have proved strong enough to protect the public in every situation while their administration has been sufficiently flexible to adapt itself to violent changes in economic conditions. When the occasion has required, regulation has restrained tendencies leading to public wrongs and abuses and has been found equally competent to protect the investment and the service.

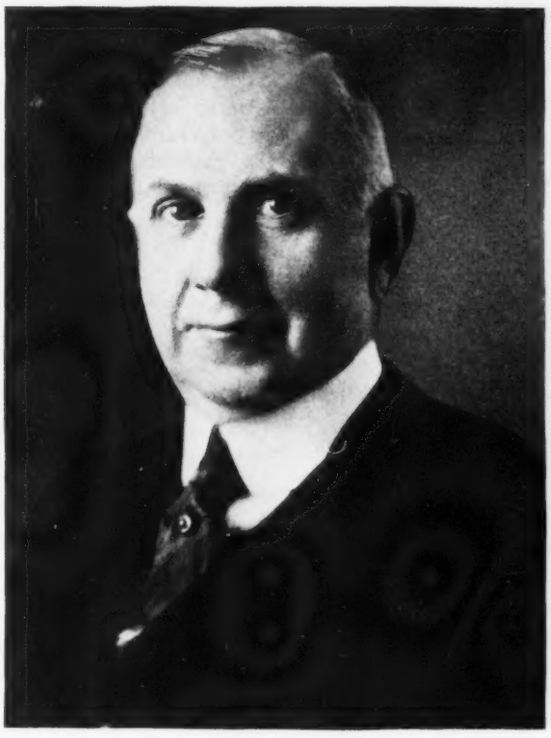
It is the hope of friends of good government and sound business that this record of achievement will be maintained. Serious problems affecting the ownership and management of the public utilities are on the horizon. They can best be met through a presentation of the facts that regulation disclosed and the beneficial results in has accomplished. Should the influence which the commissions exercise be removed, or the workings of these bodies become influenced by political considerations, both the utilities and the public would suffer.

Sound Policies Reasserted

Searching for improvements, extending service to scattered communities, helping industry, continued rate reductions, frankness regarding records. Independent press is favored

By W. W. FREEMAN
Chairman Public Policy Committee

THIS year is "Light's Golden Jubilee." It is fifty years since Edison gave to the world the first practical electric lamp. In this lamp the electric utilities had their beginning; from it has developed the whole field of electricity's usefulness. It is fitting indeed at this time that we express tribute and appreciation to Mr. Edison and that we take some measure of the progress made by these utilities in meeting public obligations.



W. W. Freeman

Amid the rapidly expanding and changing character of electrical development, one policy stands out as having been uniformly and consistently followed by all and at all times. This is the policy of growth and expansion. The electrical industry has been progressive; it has not stood still. The men responsible for electrical development understand and assume the obligation to unfold the full possibilities of electric service and translate them into everyday use for all the people, on farm, in village and in large city. In its plans, its construction of plants and facilities, its organization and financing, the industry has looked to the future. Not only has it quickly adopted advances, but it has stimulated and searched for them.

Herbert Hoover made the following statement before the World Power Conference in London, 1924:

"The factor that has been primarily responsible for the tremendous changes of the last century and without which modern civilization could not exist is mechanical power. The form in which in increasing degree such power is being applied is electrical energy—the greatest tool that has come into the hands of man. The degree to which we utilize this tool as a substitute for manual labor will largely determine the rate of our social and industrial progress."

Electrical development is progressing at a rapid pace. During the past seven years electrical service was furnished to nine million new homes, bringing the total to nineteen millions. No full measure can be taken of the benefit of this in improving family life, effecting economy in expenditure, the saving of time and making for happier living. Electricity has provided a power supply not only for factories but also for the homes. Thousands of electrical appliances are assuming the burden of house work.

HALF A MILLION FARMS SERVED

A distinct characteristic of electric progress in the last few years has been the extension of service to small towns and farms. Transmission lines, constituting a vast network even five years ago, have been still further extended to reach four thousand small towns and villages formerly without electric service. So widespread has this service now become that almost every community with more than one thousand inhabitants has electricity and in many parts of the country every community, no matter what its size, receives such service. Not only do they enjoy the benefits of electricity in their homes, but by it the door of industrial opportunity has been opened to the smallest town having reasonable transportation facilities. The spread of service to the farm continues, until now five hundred thousand farms are connected. The objective of electric service for all the people comes nearer and nearer to attainment.

With the development of great interconnected systems and mass production of power, the factories and workers of the nation are increasingly turning to electricity for power supply. The total increase of 9,800,000 hp. in the nation's industrial enterprises since 1919 has been in electric motors. President Hoover's Committee on Recent Economic Changes in the United States, in its report of May 15, after emphasizing the widespread higher living standards as characteristic of our national life, pointed out that the rise in the use of power has been three and three-quarters times faster than the growth in population, and then added:

"The increasing flexibility with which electricity can be delivered for power has enabled manufacturers and

farmers to meet high labor costs by the application of power-driven specialized machines, and power in the flexible form has penetrated into every section of the United States, including many rural areas. The survey shows that as a nation we now use as much electrical energy as all the rest of the world combined.

"Through the subdivision of power the unskilled worker has become a skilled operator, multiplying his effectiveness with specialized automatic machinery and processes. Thus the unit cost of production has been reduced, the drudgery eliminated from much unskilled work and wages maintained or actually increased."

Benefits of Interconnection Available to Public

There has been a clearer crystallization of public understanding of major trends and developments. The far-reaching economic and social benefits of interconnection, mass electric production, and large-scale development have become better understood. The function and usefulness of the holding company in bringing this about has become more generally understood. Mere size of operations causes less comment; the benefits accruing to the public from them are better comprehended. The public generally realizes that through large scale development, electric service is becoming possible to the citizens of the smallest village and to the dwellers upon farms, and that only in this way has there been created the reliable, adequate and low-cost power supply upon which the nation's industrial development is taking place. Experience has demonstrated the savings in expense, the financial stability, the fuller utilization of investment and resources, the increased efficiencies and larger capacity for service which follow unification and consolidation. They are accepted as economic necessities. Failure to apply them would indicate lack of progress.

Through the application of these principles, "as a nation, we now use as much electrical energy as all the rest of the world combined." And it should not be overlooked that all the rest of the world combined hitherto has, to a very large extent, followed the policy of governmentally owned and politically operated electrical supply, while this nation has followed the precept of the immortal Lincoln that "in all that the people can individually do as well for themselves government ought not to interfere."

The benefits of improved efficiencies, better management, large-scale development and advances in the art have been shared with the consumer. An outstanding characteristic of the past year has been rate reduction. The general cost of living continues at 70 per cent above pre-war levels; domestic electricity is 25 per cent under pre-war levels. In 1914, the average household used but 268 units of electricity; in 1928, the average used was 456. Beyond this electricity today will do more than it was possible for it to do then, for scientific advance has provided the consumer with better and additional methods of utilizing it.

Investment in Securities Shows Confidence

Large increases in demand for service; the necessity for large investments in facilities, which is characteristic of the business; the greater cost of furnishing service as it extends to sparsely settled territories, continue to require large sums of money in financing growth. In the year 1928, during this period of intensive governmental investigation, continued public confidence in private operation was demonstrated by the purchase of $1,600,000,000 of security offerings of electric light and power companies.

The year just passed has been particularly noteworthy for the public attention directed to the electric utilities. Their condition, methods, practices and performances have been a major subject of public discussion, which has ranged from vituperative attack and political abuse to sober and constructive consideration of major questions, and has covered most of the degrees between. Utilities today live under the microscope. In the scrutiny they have undergone real performance in public service that has often been overlooked, faults have been magnified and motives distorted. But, on the whole, discussion has redounded to their benefit, and it will do so still more when complete information becomes diffused and the public mind better informed.

The source of inquiry has largely been the Federal Trade Commission. Up to this time, its investigation has been directed largely to the National Electric Light Association, its geographic divisions and to public activities. The broad work of the association toward accomplishment of its object—"to advance the art and science of the production, distribution and use of electric energy for public service"—has as yet received slight attention. The local state information bureaus have been thoroughly investigated.

Federal Commission Given Free Access to Records

Although the association, as well as its divisions and the state bureaus was early apprised that there was doubt whether the Federal Trade Commission could compel the furnishing of much of the information sought, a decision was reached at the outset to comply completely and promptly with every request of the commission. In accordance with this decision, the commission representatives have been accorded full and free access to all books, records, papers, reports and correspondence of the association. No request has been refused. No question of right or authority has been raised. The result has been a most rigorous inquiry into every activity of the association for the last 20 years. More than a hundred witnesses have been heard, over 7,000 pages of testimony have been transcribed, and 4,300 documents and other exhibits have been introduced into evidence. We have voluntarily undergone a miscroscopic examination which has delved into records from the dust-covered volumes of the past to the fresh ink of the present, and into thousands of scattered incidents arising from one end of the country to the other.

We understand that this phase of the investigation on the commission side is now practically completed. The commission as yet has announced no conclusions. The industry has not as yet presented evidence in its own behalf. Public impressions have come almost entirely from newspaper reports.

Your committee is confident, as the result of this critical review of the activities of the association for the last half century, and without claiming perfection, that it will be found that its policies have been sound, its work beneficial to the public and the industry, its ideals consistent with the highest American business standards, its mistakes few and trivial considering the number of individuals involved and the large volume of work accomplished.

An independent press is essential to free government. The N.E.L.A. believes in an uncontrolled and undominated press, free to criticize or commend as conditions may warrant.

The utilities recognize that the furnishing of information regarding their purposes, accomplishments, needs and difficulties is one of the obligations of public service. In recent years the association and its member companies have made every effort to inform customers, investors and the public. To that end the association has utilized every opportunity for creating a more complete public understanding. On matters of opinion it has stated its own views; on controversial subjects it has given its own side. Endeavor has been made to correct inaccuracies and misinterpretations. It has done so openly and frankly. Publicity material has always shown the source, so that every one to whom it was sent has known from whence it came. There may have been occasional instances of overzeal in distribution, but we may congratulate ourselves that criticism has been directed to excessiveness of publicity rather than to secretiveness.

At the last annual convention this association by resolution recommended to its members a continuation of the policy of preparing and diffusing as widely as possible full, accurate and timely information on all phases of the business. Truth and accuracy were declared to be the standards by which its statements should be judged. Your committee is glad to be able to report that out of the large volume of publications and informational items circulated by the association, all of which for recent years has been freely submitted to commission scrutiny, none has been found which cannot stand that test. The adverse comment which has been made upon association publicity has not been directed to its truth or accuracy, but rather to its volume and the methods of distribution. The same is true, with few exceptions, of the publicity emanating from the local state bureaus.

The widespread distribution of informational material necessarily involves contacts with those who receive it. From distribution to newspapers come naturally relationships with those engaged in their publication. From the furnishing of data to schools and oclleges come relationships with those who use it. Such contacts are proper, natural, necessary and desirable for all concerned, if informational service is to be efficient. The relationship necessitates a high standard on both sides. It is inconceivable that the industry should refuse any reasonable request for information helpful to those engaged in public instruction. It is improbable that teachers in our schools or instructors in our universities would accept for their use any material which is not truthful, accurate and valuable, even if an attempt were made to foist the opposite character upon them. The whole question of co-operation and relationship between education on the one hand and commerce, business and industry on the other is one of common concern, by no means confined to the utilities. It involves practically every great American industry. The methods must be finally determined by the educational authorities. The electric industry has always co-operated with them in the fullest degree. It deserves to continue to do so. It hopes that in the near future a more definite basis for that relationship will be worked out and declared by those responsible for educational methods. The industry expects to conform with their final policies.

The Four Vice-Presidents of the National Electric Light Association

E. F. GRUHL

M. E. SAMPSELL

J. F. OWENS

W. A. JONES

The newly-elected vice-president announced at the N.E.L.A. convention was Edwin F. Gruhl, vice-president of the North American Company

The electrical industry has long been recognized as a leader in research. In the laboratories of the electrical manufacturers and in the field experimentation of the operating companies there has been ceaseless search for new truths, added applications and further harnessing of this great instrument for the benefit of mankind. This effort has been rich in rewards, shared not alone by the electric industry and its customers, but aiding other industries and reaching into the lives of all the people. With the formulation of the great program for stimulation of pure science research, under the direction of the National Research Council, the National Electric Light Association, in behalf of the electric light and power companies, is glad to announce its full participation in the movement. The National Electric Light Association thus confirms its confidence in the body of men devoting their lives to research who have already given so much and who have in their hands the unfolding of a still richer future.

Ours is a responsibility for bringing to the American people the best electric service at lowest possible cost which human capabilities can accomplish. To this end the National Electric Light Association and its members rededicate themselves.

El Paso Electric Company

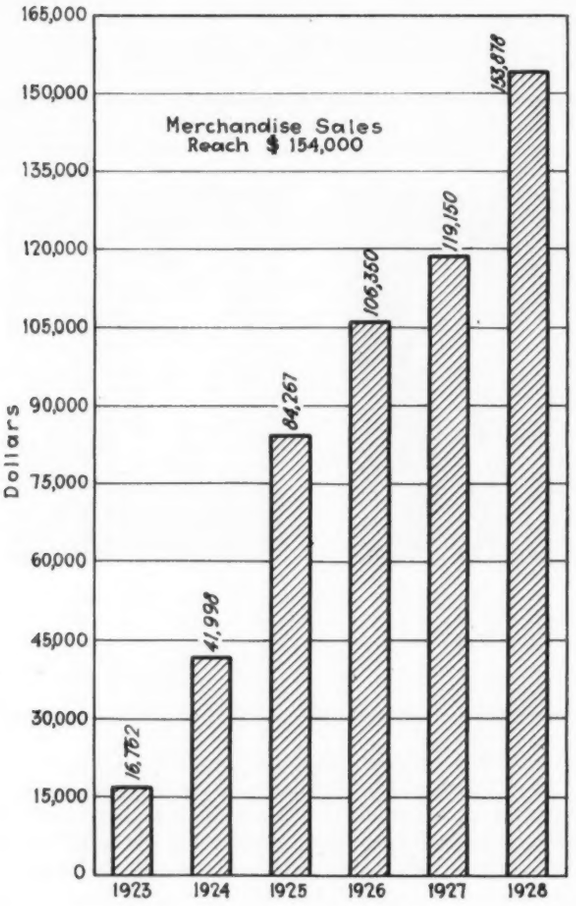
RECEIVES

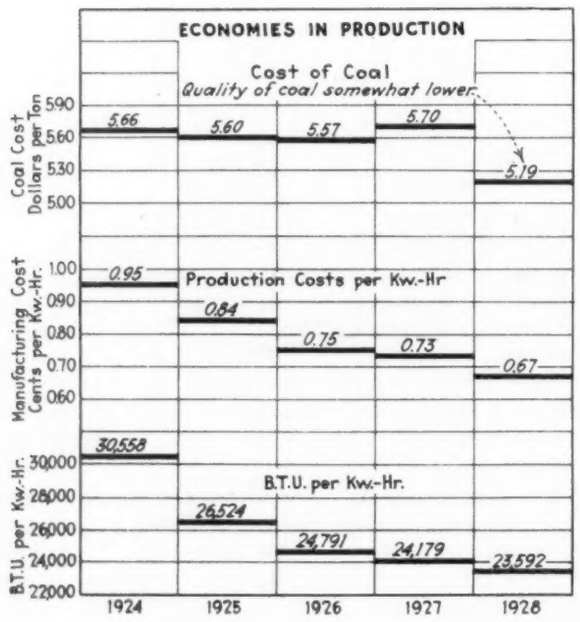
Coffin Award

for 1929

F. J. Gannon
General Manager

MARKED reduction in investment per dollar of gross revenue, increase in average load of domestic customers, development of lighting load, increased service reliability, exceptional over-all plan efficiency, excellent customer and employee relations, a wonderful safety record, and development of rural service are the major achievements which have won for the El Paso (Texas) Electric Company the "Charles A. Coffin Award" for 1929.





The territory served by this company embraces El Paso, Texas (600 miles distant from any city of equal size), Juarez, Mexico, and the rural region extending 120 miles up and down the Rio Grande valley. The population served is 148,160, about 50 per cent of which is Mexican. There was an 8 per cent increase in population during 1928.

Achievements

Investment per Dollar Gross Revenue:

$3.47 in 1928, $3.59 in 1927—a 3.3 per cent increase in earning power.

Average Load of Domestic Customers:

6.9 per cent increase, despite 7.5 per cent gain in new customers; 30 per cent increase in merchandise sales; district representative plan increases per capita sales 200 per cent.

Lighting Load:

Illuminating engineers made important additions to street lighting, electric signs, lighting of outdoor sports, aviation field illumination, as well as window and building lighting.

Reliability of Service:

Greatly improved by rehabilitation of isolated plants acquired, extensions and improvement, centralized dispatching, reorganization of trouble department, double feeder lines to important customers, radio communication, automatic signal systems.

Over-all Efficiency:

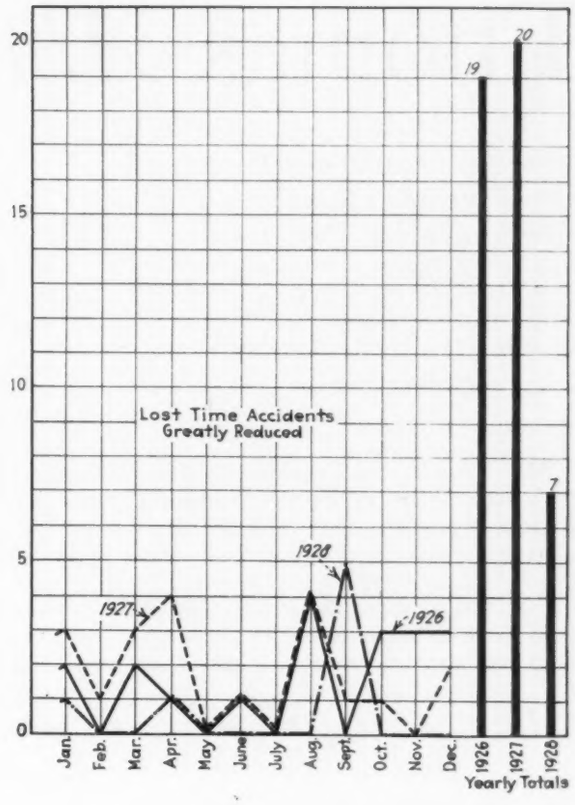
Over-all efficiency of power plant increased 2.4 per cent and cost of net kilowatt-hours delivered reduced 8.28 per cent.

Customer and Employee Relations:

Better service slips and letters from customers show great improvement in relations. Actively participate in all civic enterprises. Affording every opportunity for self-improvement and advancement has developed loyal, efficient, courteous employees.

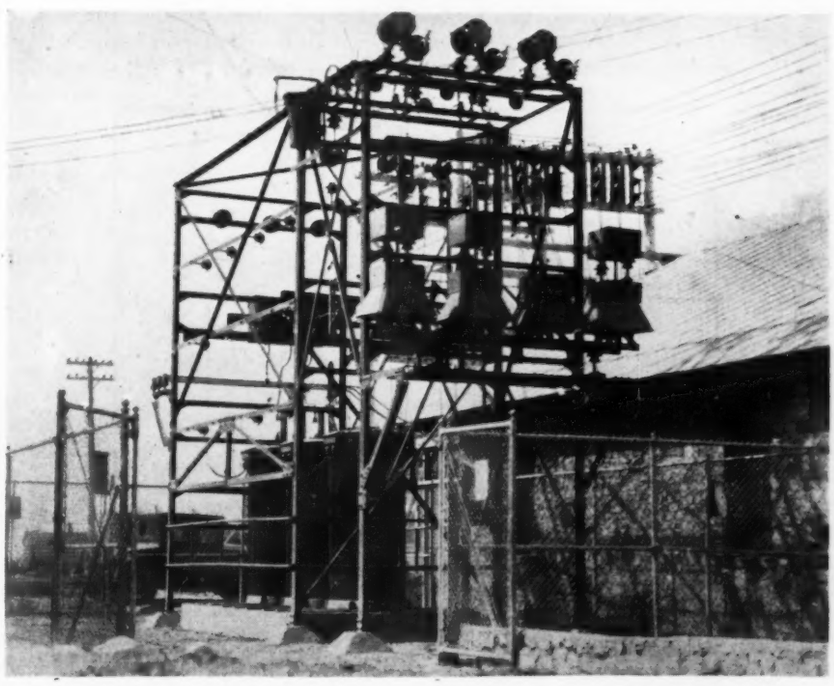
Safety Record:

With 205,000 man-hours devoted to distribution work and autos traveling 366,000 miles, lost-time accidents have been reduced to surprisingly small amount. Regular safety meetings and demonstrations.



Rural Service:

With faith in future company has made large investments to render service. Long-line extensions made to encourage irrigation and reclamation of waste land, with subsequent increase in population and added loads. Numerous farms, dairies, cotton gin and oil mills.



Thomas *Aladdin* Edison *Rubbed a Lamp*

Out of the vacuum and the charred thread of the incandescent lamp has come ten billion dollars of new wealth. But beyond this has come the electrification of America

By Berton Braley

FIFTY years ago Thomas "Aladdin" Edison rubbed a lamp. But unlike the Arabian Nights' Aladdin it was no fortuitous rubbing. It was not a magic that responded at the first touch. Miracles of modernity do not happen that way. Before Edison rubbed his lamp he had to imagine his lamp, he had to create his lamp. And before he could either imagine or create he had to have the equipment of mind, of spirit and of body—the patience, the industry, the vision and the persistence that are back of any valid success. He had to have character, and further and beyond all that, he had to possess that unaccountable, elusive but inescapable quality that is known as genius.

Not immediately did a host of genii leap to serve it. Before modern genii can work their enchantments they have to be equipped with tools and backed with money. But a plant in New York and a plant in Appleton, Wis., began to function—the New York station financed from the inventor's own purse—and a few homes knew for the first time the luxury of light that is summoned and dismissed by the push of a button or the turn of a switch.

A new era was begun. What may be a new civilization was inaugurated. For seven thousand years or more of recorded history there had been practically no progress in the utilization of the forces of nature in the service of man. Then Watt invented the steam engine, about 150 years ago. But though a steam engine lifted a little of the burden from man's back and speeded his transportation greatly, the transportation of power itself was possible only for a few feet—and with huge waste.

With the invention of the incandescent light opened the era of power distribution. The need of and the demand for this new, cleanly, efficient and dependable form of illumination brought a need of and a demand for its wide use. And Edison himself, and hundreds of other brilliant slaves and masters of the lamp, proceeded to fulfill the need the lamp had created. The central generating stations multiplied, alternating current and high-tension transmission evolved in response to the country's necessities. Greater grew the size of generators and wider the web of transmission lines. Perhaps the steam turbine might have come anyhow, but its invention and perfection were hastened by the demand of the electrical industry for more efficient driving mechanism.

With the distribution of power in the form of light came the call for the localized use of the power itself. And thus there grew swiftly a phenomenon new in the world—the application of power in small units to the labor of household and of shop.

In 19,000,000 homes in America this localized power from central stations gives the light which makes naught of night. In 10,000,000 of these homes this distributed power purrs over tasks that once made housewives drudges. On hundreds of thousands of farms this power runs the churns, milks the cows, does the washing, hums merrily as it does the cleaning that once made the farm wife a slave.

Out of the vacuum and the charred thread of the incandescent light has come $10,000,000,000 of new wealth—wealth that is added to the sum of things and subtracted from the infinite and exhaustless forces of nature. It is a kind of wealth that economists scarcely knew a hundred years ago, a kind of wealth that Russia, for example, denies—and starves by denying.

And this $10,000,000,000 is only the material, tangible, touchable sum of these new riches. What the lamp of "Aladdin" Edison and the electrification of America which followed it—and which has only begun—mean in terms of human comfort, human happiness, release from drudgery, increase in productiveness, with larger leisure and broader opportunities, are things beyond estimate; the full significance is imponderable and incalculable.

Philosophers and economists who are still under the domination of economic shibboleths of a "golden era" that existed only in their imaginations may rail at mass production, but the mass that benefits by it knows that life is better, broader and kindlier because we produce more with less labor. That mass production creates millionaires is true; that it enables ordinary folk to live as no millionaire could have lived even a hundred years ago is less emphasized, but far more important.

An operator at a lever
Doing a thousand men's endeavor;
A crane man, sitting aloft, who runs
A titan, lifting a thousand tons;
A switchboard tender, bossing forces
Stronger than half a million horses;
These be spectacles characteristic
Of matters "grossly materialistic."

Of course, if you think of the sweat that's saved
Of the one-time drudges unenslaved,
Of the way man's strength is multiplied
And his dream-horizon amplified;
Of the larger scope of the human brain
When the body's free from its dreary strain—
If you think of these—then the dull machine
Might possibly, somehow, seem to mean
A little more than a mass of steel,
Might even distantly reveal
A sort of a soul whose patient might
Is lifting men upward to the light.
But of course, in this sordid commercial day,
No realist ever could think that way!

For the mechanism by which mass production is accomplished the lamp of "Aladdin" Edison is basically responsible. Until that first crude but successful bulb glowed in his laboratory electricity was mostly something that coursed through arc lights which sputtered and gathered bugs. From the date of his invention electricity became the greatest single factor in the industrial progress of America and the world. It is because this country is electrified beyond any other that it excels in production and in industrial efficiency beyond any other. The incandescent lamp lights the path of progress.

And remember that this accelerating pace of industry, this high-speed process, is an acceleration of machines, not of men. It is the mechanical slaves of the lamp, not the human workmen, that work harder and faster. It was in those good old days of hand labor that men were driven for twelve and fourteen hours a day, that men fell exhausted into bed at the end of a shift and woke only in time to begin another. Philosophers may hanker for those halcyon times, but the workingman cherishes no such illusions.

Fifty years ago Thomas "Aladdin" Edison rubbed a lamp and the electrical industry as we know it now was born. Its social, material, industrial and spiritual ramifications the historian of 3000 A.D. may possibly be able to estimate, but we cannot. We can count, by mathematics such as only an Einstein might understand, the physical wealth that hangs by that burnt fiber in a vacuum, but even with the aid of calculating machines that think and ledgers that talk we are probably shy several billions of dollars. Of the other values created by the lamp of Aladdin we can have no approximation. We are in the realm of the infinite, where the "blindest bluffs hold good, dear lass, and the wildest tales are true!"

Let the bards turn to yesterday for romance; we know she is with us today and leading us into the bright and brave promise of tomorrow. We recognize her not only when she flashes across the sky with the air mail, but when she perches in the grimy cab of the coal dumper beside the sooty-faced operator whose levers do the work of a thousand sweating men. She rides on the radio waves and she runs the washing machine. Her glamour is no less now that she has gone to work than when she sang songs among the sirens as Ulysses passed, bound to his mast. And where once only a few adventurers might follow her fleeting footsteps, the lamp of Aladdin now lights her trail for us all.

In this extension of the frontiers of achievement we have all had a part. Knowingly or unknowingly, we further the vision. But the vision itself must be that of genius. Invention is not accident, but design.

Back of the beating hammer
By which the steel is wrought.
Back of the workshop's clamor
The seeker may find the Thought.
The Thought that is ever master
Of iron and steam and steel.
That rises above disaster
And tramples it under heel!

The drudge may fret and tinker
Or labor with lusty blows,
But back of him stands the Thinker,
The clear-eyed man who Knows;
For into each plow or saber,
Each piece and part and whole,
Must go the Brains of Labor,
Which gives the work a soul!

Back of the motors humming,
Back of the belts that sing,
Back of the hammers drumming,
Back of the cranes that swing,
There is the Eye which scans them,
Watching through stress and strain,
There is the Mind which plans them—
Back of the brawn, the Brain!

Might of the roaring boiler,
Force of the engine's thrust,
Strength of the sweating toiler,
Greatly in these we trust.
But back of them stands the Schemer,
The Thinker who drives things through;
Back of the Job—the Dreamer
Who's making the dream come true!

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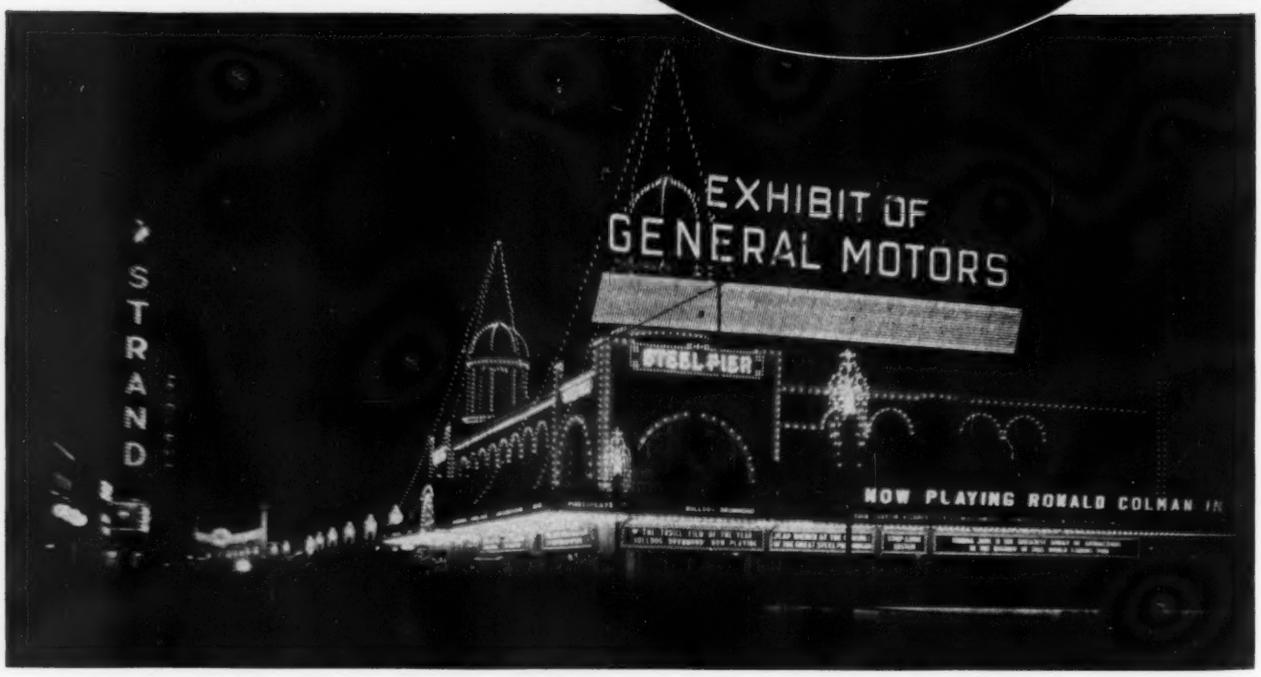


Why Grow Like Topsy?

Unit capital investment increasing. Operating ratio and rates cannot be changed greatly. System planning fundamental to economical growth and operation

By A. C. MARSHALL
Vice-President Detroit Edison Company

THE public utility business is a science and the successful utility man is one who studies his business from the scientific viewpoint. In any such study there are two ratios that stick up like a sore thumb. The first is the investment per dollar of earnings and the second is the operating ratio, or the ratio of direct operating expense to gross earnings. While these two figures are vitally tied into the prosperity of a company, still they are independent figures. Changing one does not thereby change the other, but conditions of solvency sometimes require that if one is changed the other must be.

A. C. Marshall

Consider for a moment the first figure, the total investment per dollar of earnings. In water-power systems this will be higher than where steam-generated power is used. But in such water-power companies the operating ratio is low, so a return can be earned on a larger investment per dollar of earnings. Companies of which all or a large part of the output is generated by steam find that this figure falls in the neighborhood of four to five dollars.

INVESTMENT INCREASING

My first point is that there are developments in the industry tending to increase this figure in spite of rapidly growing earnings. There is an increasing amount of necessary expenditures, especially in our larger cities, that do not bring in a cent of additional earnings. Some of these are as follows:

(a) Replacing poles and overhead wires with underground lines in greater and greater areas.

(b) Cost of better and more ornamental substation buildings to conform to high-grade residential or commercial environments.

(c) The increasing necessity for reliability of service requires expenditures for better equipment, more stand-by or reserve in lines and stations, and better relay protection. This greater reliability is going to be demanded on account of the development of new uses for power, such as the use of oil burners, refrigerators and ranges in residence service, and increased use of power for heat-treating and basic processes where an interruption will result in large loss, in addition to the mere loss of time and output.

(d) The trend in all industry toward replacing man power with mechanical power is being felt in our own operations. In other industries this change results in great benefit to our business, as every such move requires a greater use of mechanical power which it is our business to furnish. In our own operations, while it may result in decreased operating expenses, it also increases the investment per dollar of earnings. This change is going on not only in outside plant, such as the development of automatic substations and water-power plants, but in other departments as well. Mechanical accounting devices are an illustration. Our accounting departments are beginning to look like fine machine shops.

(e) The large capacity of our interconnected systems has increased the duty on circuit breakers and other equipment. This has required increasing expenditures for larger and better circuit breakers, the cost of which has risen following an alarmingly steep curve.

(f) The lure of greater economy of generation is leading power plant designers to strive constantly after higher steam pressure and temperature and to incorporate more and more new and costly features. The result is that, in spite of 100,000-kw. and larger turbines, the total cost of power plants per kilowatt does not seem to be decreasing.

It will be noted that these expenditures fall into two classes. None of them contributes to earnings, but those in one group do result in lower operating expenses, while the other do not, or at least do so in a very indirect manner. These latter are contributions to civic improvements or to the requirements of a higher grade of service.

It is admitted that there are a few developments tending the other way, that is, toward getting increased earnings from the same investment. Residence service is promising. We certainly expect to increase materially the annual sale of kilowatt-hours per residence customer. Here again, however, the electric range, one of the best producers of increased revenue, requires a considerable increase in investment to serve it satisfactorily. The refrigerator and oil burner are almost pure gain, as they require very little, if any, additional equipment. But earnings, in dollars, per residence customer will not increase as fast as the kilowatt-hour consumption. The kilowatt-hour sales will increase because of lower rates. For an example, in one city the average annual use of all residence customers in 1928 was 3,384, but the average rate was so low that the earnings per customer were less than $30 per year.

On the whole, the developments tending to increase the investment per dollar of earnings are going to overbalance the contrary tendencies, and there is almost surely going to be a net increase in this figure during the next ten to twenty years. Those utilities now attempting to make forecasts for ten or more years in the future confirm this opinion.

If there is going to be for some years to come a tendency to require more capital per dollar of earnings, and if we wish to maintain or improve our present rate of return, a quite decided reduction in the operating ratio will be necessary. If an increase in rates is impossible, then the operating ratio can only be decreased by a decrease in operating expense, and to lower operating expense by an amount corresponding to or required by an increase of, say, one dollar in the investment per dollar of earnings is almost impossible. One effort may be made that will improve the situation of both ends. This is to get more and better system capacity per dollar of investment. One way to approach this is by better and more comprehensive system planning.

Operating Ratio Must Be Reduced

Assuming, then, for the sake of the discussion that the total investment per dollar of earnings is going to increase for some years to come, a serious question arises as to how this is to be offset. If we want to retain approximately our present return on total investment, there is just one remedy; that is, a reduction in the operating ratio. This is the ratio of direct operating expense to gross earnings; as usually used the operating figure includes taxes, but no appropriations to depreciation or retirement reserve. Expressed as the figure, it is the amount of every dollar of earnings that must go for this direct operating expense. It is usually lower for water-power systems than for companies generating their power by steam. For the latter type of companies the ratio will probably fall between 50 and 60 per cent.

There seems to be no way of getting around this fact that if the investment per dollar of earnings increases, to earn the same return on the investment the operating ratio must fall. Like all ratios, this value can be altered by changing either term of the ratio. We can reduce the operation ratio either by reducing operating expense or by raising rates. You will remember the story of the sick darky, as told by our old friends the two black crows: He was advised by his doctor to eat chicken broth every day and stay in nights, "and everybody knows you can't do that." That applies with equal truth to the matter of raising rates. "Everybody knows you can't do that." The only alternative is to reduce operating expense.

It is easy to figure the reduction necessary for a given increase in the investment per dollar of earnings. Consider an increase from four dollars to five dollars (which has occurred on the property of some companies in a comparatively few years). Let us assume that 13 per cent is required to cover return, fixed charges of all kinds (except taxes) but including depreciation reserve. Then an increase of one dollar in the investment per dollar earned means that out of every dollar of gross earnings there will be required 13 cents to cover the cost of this extra dollar, in addition to the 52 cents required to carry the original four dollars. Under the former condition, we could take 52 cents out of every dollar of earnings and pay 13 cents on each dollar of investment, by operating on 48 cents. Under the latter condition, if 13 cents is needed to carry each of the five dollars of investment (instead of four), this will take 65 cents out of every dollar and leave only 35 cents for operating. "And everybody knows you can't do that." In other words, for every increase of one dollar in the investment per dollar of earnings the operating ratio must drop 13 per cent to maintain the same ratio of return unless rates are raised.

It may be said that a company, even if the investment is on a four-dollar basis, cannot operate on 48 per cent. The above carrying charges are computed on the total investment and not on the outstanding securities. A more probable set-up would be that such a company would operate on, say, 52 per cent, leaving 48 cents of each dollar earned, or 12 per cent on total investment, which might be 13 per cent or more on outstanding securities.

At the risk of tiresome repetition, let us summarize: If there is going to be for some years to come a tendency to require more capital per dollar of earnings, and if we want to maintain or improve our present rate of return, a quite decided reduction in the operating ratio will be necessary. If an increase in rates is impossible, then the operating ratio can only be decreased by a decrease in operating expense, and to lower operating expense by an amount corresponding to or required by an increase of, say, one dollar in the investment per dollar of earnings is almost impossible.

The foregoing is only putting in unit figures for the sake of emphasis what we all know, and setting it forth here is to emphasize one effort that may be made which will improve the situation at both ends; that is, will tend to decrease our investment per dollar of earnings and at the same time reduce operating expense. This is to get more and better system capacity per dollar of investment. One way to approach this is by better and more comprehensive system planning.

Most of our systems have "just growed," like Topsy. The result is they have been rebuilt time and again to meet the duties imposed by increased system capacity. The responsibility for this condition is not entirely on the engineers; in fact, I am not attempting to place the responsibility. If the executives did not foresee the

great growth of the industry, it is no wonder the engineers did not do so. Also, equipment has not been available except as developed by the experience of living with these high-voltage and large-capacity systems. Some of our companies have rebuilt substations several times, each time putting in the very best available equipment and each time seeing the whole thing scrapped in a short time because it failed to meet the new duties.

Executives, engineers and manufacturers have all had a part in this lack of comprehensive system planning, but our present purpose is not to place responsibility, but to discuss remedies.

It is unnecessary to go into detail as to how costly this method of growth has been. Millions of dollars have been spent for transmission lines, circuit breakers and substation equipment that have proved inadequate and have been retired long before the end of a reasonable life. In spite of many drastic write-offs, plant account is certainly much greater than it would have been if it had been possible to develop a system plan years ago that would have provided indefinite expansion without going back and scrapping the beginnings.

As to the other term of the ratio, operating expense, this inadequacy of equipment has decidedly increased operating and maintenance expense, as these early and frequently occurring failures have caused abnormally high maintenance expense.

Are we going to keep on growing, like Topsy? If Eva be assumed to typify orderly development as contrasted to the haphazard growth of Topsy, should we not emulate little Eva for a while? The time is surely ripe for definite system planning on a permanent basis, and this is largely up to the engineers for the details of the plan and to the executives to visualize the problem. The past methods have worked fairly well in the sense that reasonably good service has been given, but they have proved expensive because continually proving inadequate to meet constantly increasing duties.

Master Plan Necessary

Any system that does not provide for indefinite expansion without going back and tearing out all the foundations is all wrong. A master plan is necessary. This master plan should be flexible; it should be capable of adaptation to meet shifting conditions and it should provide for almost indefinite expansion. Master plans which do not avoid inherent limitations to the growth of a system, such as the presence of excessive short-circuit currents, the lack of adequate quantities of condensing water, or streets choked with conduit runs, etc., are not suitable. There must be a prearranged solution to such foreseen difficulties, which are bound to arise as the system grows, and investment made in accordance with the plan should remain useful for a normal period of life. It should not be rendered obsolete in a few years because an unexpected growth has made necessary a complete rearrangement.

As a concrete illustration, assume that to serve a certain district a company has built a substation of 40,000 kw. capacity. The load grows rapidly until it is evident that very soon an additional 20,000, 30,000 or 40,000 kw. will be needed. Is it too much to ask or unreasonable to assume that the system has been designed so that all that will be required is the construction of another substation of similar design to serve the increased load, and that it will not be necessary to rebuild the first substation as well as building the second, and that it will not be necessary to go back to a power plant and install new circuit breakers that cost many times the price of the discarded ones?

Once again I am not finding fault or saying that our business could have developed otherwise, but I am pleading for a start now toward a comprehensive system planning that will make for a different situation five years from now.

Slow Development of Distribution Equipment

As to that part of the general system most susceptible to improvement, it would seem that the science of distribution, in theory, practice and equipment, is far behind that of generating plant, transmission lines, lamps or meters. There has not only been slow development of distribution equipment that will operate satisfactorily on our present high-voltage and large-capacity systems, but there is an absolute lack of agreement among the engineers of large companies as to the best method of distribution for a large city, served by several power plants and many substations, through both overhead and underground lines.

It is no doubt inevitable that in the rapid development of a complicated industry some parts of it will be perfected and standardized more quickly than will be the case with others.

Budget control of both construction expenditures and operating expense is a great help to the executive and to the engineer in working out a comprehensive scheme of system development. The budget provides a convenient and automatic method of a review by the executive of the engineer's plans and estimates. The engineer, if he avails himself of it, finds the budget a convenient means of co-ordinating his plans with past developments and of judging the reasonable nature of his proposed expenditures.

A good budget is the climax of the whole series of studies that began with the consideration of the progress of the art of central-station service and of changes in the habits and methods of living of the people who will be customers of the electric utility ten or twenty years from now, and that terminates in the project sheets for new items to be added to the construction program of the company.

So we come back to the title of this discussion. It is largely up to the engineers as to the choice of our heroine. Shall we grow like Topsy or shall we grow according to plan?

Alert Accountants Co-operate with Other Branches

The Accounting Section must be alert continually to meet the constantly changing conditions in the march of progress of the industry. . . .

There are an infinite number of questions arising in the Commercial, Engineering and Public Relations Sections which need our assistance, and we need theirs. . . .

Serial reports prove conclusively the valuable research which has been done and are of unquestionable value to the industry as a whole. . . .

J. F. Ford,
Chairman National Accounting Section.

Migration of Industry

By JAMES L. MADDEN
Vice-President Metropolitan Life Insurance Company

James L. Madden

SOME months ago the association invited the Metropolitan Life Insurance Company to undertake a fact-finding survey which would get at the fundamental industrial development situation in the United States during 1926 and 1927. Through the assistance of numerous public utility companies, railroad, chambers of commerce and other associations, as well as governmental agencies, 2,084 communities contributed their experience concerning the migration of industry and other forms of industrial development. These represented 75 per cent of the total urban population of the United States and about two-thirds of the urban population of Canada.

It was found that the real industrial development came from new industries and started within the communities themselves, the migration of industry being relegated to a much smaller rôle in economic growth than was expected. Relocations accounted for only 9.4 per cent of the plants gained by the various communities. New industries accounted for 81.8 per cent of the plants gained, while branch plants accounted for the remainder of 8.8 per cent.

During the period surveyed 5,908 plants were lost to American cities. About 18 per cent of these moved away, while the remaining 82 per cent went out of business. The total number of plants lost was about 60 per cent of those gained.

Arbitrarily taking a population of 50,000 as a dividing line between larger and smaller cities, we find that the branches and relocations were divided nearly equally between these two types of cities, but that approximately three-fourths of the local plants were established in the larger cities. All types established in the larger cities accounted for 58.4 per cent of the total gains in employment reported in the survey. The larger cities of 50,000 population and over received 54 per cent of the plants employing 100 or more workers, whereas the smaller cities received the remaining 46 per cent of these larger plants, more than one-half of which are located in cities of less than 10,000 population.

Markets are advanced most frequently as the reason for location of plants. The business man, who has tuned in his sales practices to the high demand of his consumers is naturally going to consider the location of new plants in relation to his marketing program. While in many industries labor is regarded as of most importance in the selection of plant sites, the survey indicated that labor ranks second to markets as the predominating factor in the location of plants. Transportation ranks third. This is not surprising, when we realize the intimate relationship between marketing and transportation.

As to the reasons underlying the industrial growth of the small cities, those most frequently reported might directly or indirectly be related to lower manufacturing costs. Improved railway and power service has also been beneficial to the development of these cities. Electrical power has become available within the last five years for the first time to four thousand towns and villages formerly without service. These small towns have the same quality of twenty-four-hour electric service formerly enjoyed only by large cities. They also have unlimited electric power supplies available to them to meet the expanding demands incidental to the growth of their community. Factories can locate in a small town supplied with electric power from an interconnected system, confident that they can have dependable service.

There are more relocations in the textiles and allied products than in any other industry; machinery ranks second, lumber and allied lines third.

Enough emphasis has not been placed upon the analysis of losses of plants, and compartively little is being done in a definite, organized way to make the new local and already existing industries in a community so happy and prosperous that they want to stay. Yet substantial sums of money very frequently have been raised and definite, organized movements initiated for the purpose of attracting industries from other cities. The real prosperity of a community depends upon stabilization. In many territories a substantial part of all industrial development has been in these smaller cities.

There is a definite need for the present pioneering effort to be continued on a systematic basis. The development and movement of industry so affects our social and economic growth, nationally and territorially, that some machinery is necessary to record what is taking place. The United States Department of Commerce would be the logical body.

Superhumans for Better Institutions

Greatest need of electrical industry is for superior men and women. The mutual interest of youth, colleges and utilities. Attitude on educational relationships

By JOHN F. GILCHRIST
Vice-President Commonwealth Edison Company

John F. Gilchrist

LOOKING to the future, the greatest need of this industry is for superior men and women—superior in mental and physical vigor, superior in common sense, superior in general and special education, trained young people with an intimate knowledge of the present-day conditions in the business in which they expect to embark, so that on embarking there shall be the least time lost in finding themselves.

The period of physical vigor in the human being is so short that in occupations where experience added to other qualifications is a matter of so much importance it is essential that no time should be lost in orienting the trained novitiate so that he may promptly assume the responsibilities of the position for which he has been trained.

The old statement that there is always room at the top was never truer than it is today in commerce and industry. How often it occurs that the greatest difficulty is experienced in finding the persons to fill the vacancies left by death or retirement, and while this is conspicuous in the case of the heads of great institutions, it exists in just the same way in the case of the "subheads," of whom there are a much greater number.

It is not at all uncommon in the present day for a large company to acquire a smaller one principally for the purpose of securing the services of the head of the smaller institution. And to illustrate in another way this dearth of supermen capable of filling the biggest of earth's jobs, we can recall many cases where some great property has been seen to thrive and make progress under one man only to retrograde under his successor. In such cases it is impossible to avoid the conclusion that when the able man died or retired there was no one of equal or superior capacity coming along to take his place.

Such situations have not occurred frequently in the electric utility industry, but we are reaching a size and the young men who have grown up with the industry and brought it to this point are reaching a period of life where changes must occur, and therefore, if we are to be alert and progressive and ready for the emergencies, it is important that we should give thought to meeting such situations in our business.

Here is a task and a situation in which foresight, proper education and training are most important factors, a situation which should be of the greatest interest to the young men and women of the nation looking for careers, to the educators of the nation who wish to serve by preparing young men and women for effective, useful lives, and to the owners, directors and executives of the utilities who wish constantly to improve the efficiency of their service to the public by having superior material to recruit and build up their organizations so that they will render the most complete service in the most satisfactory and economical way.

The very natural way to attack this problem is for the executives of the utilities to turn to the institutions of learning, universities and colleges, present their matter and ask for co-operation. In order that the young people there being educated may be particularly prepared for the work in which they are going, and in order to stir up the interest on all sides, it is desirable to have a very general understanding of the character of the work into which the student is going so that he may fit in to the best possible advantage and may avoid discouraging experiences and delays in finding himself and getting started. Without much study, it is difficult for the college professor or the layman to appreciate the possibilities for the employment of trained men and women in the utility business owing to the growing complexities requiring superior training, and also to the rapid growth of the business and its potentialities generally.

Why should the young college-bred men and women want to take up work in the electrical industry as their life work?

Why should the universities and educational institutions take a great interest in the electrical industry?

Why should the electrical executive want a close intimacy with the faculties of the nation's higher schools?

Our business is likely to become the greatest of all businesses. The want for power may become the greatest human want as methods for applying it are worked out and as these methods become known to the individual. In twenty years, or at the time when the boys and girls coming out of the colleges today have reached their maximum value, there should be at least forty billions of capital invested in this business. There is no question in my mind that this industry will shortly pass the railroad transportation business in capital invested and yearly earnings. There is no reason to think that for many years to come the rate of increase in the electrical requirements will not accelerate as compared with the period we have just gone through rather than decrease.

Why Three Groups Should Be Interested

The youth should desire to enter the electrical business because it gives him an opportunity for a vigorous, active life of service which is the most worth while, in a large and important world's industry, perhaps destined to be the greatest of industries, at good remuneration, with an excellent opportunity to invest his savings advantageously, which is the most sure and honorable way of becoming independent. It brings him into an industry involving some of the biggest and most interesting problems that he will find in any modern world occupation, such as dealing with the human passions, jealousy, envy, personal ambition and greed in organization and overcoming these great obstacles to co-operative progress; the study of human nature and methods of dealing with it to bring out the best in those reactions which develop harmony, collective ambition and all the states of the human mind which result in accomplishment and high production; the art of building the organization where great men with no loss of spirit will work under other great men; intricate, absorbing questions of finance, administration, law and other fields, and participation in a business where the opportunities for becoming well acquainted and becoming well known and useful citizens in the community are greater than in almost any other industry.

The institutions of learning should take a vigorous, personal interest in the electric power industry. First, from the general standpoint, it offers a great boon to humanity, and in order to know all these advantages and derive the greatest benefit from them, general education should involve a rather intimate acquaintance with the up-to-date electrical situation. Further, because of the industry's importance and extremely rapid growth, increasingly large numbers of people will become engaged in it each year, and there is not only a great opportunity of assisting the young people of the nation to get into most desirable occupations, an opportunity to render a great service to humanity by providing most practical education for young men and women who desire to go into this industry and are going into it in large numbers and who very soon will be dominating its policies, but there is the greatest opportunity of having an important hand in molding the underlying principles and policies which will govern these utilities a few years hence. Thus responsibility for the public utility service of the future is now resting upon the shoulders of the educators.

Utility executives should welcome the advent of the college-bred men and women in his business, because it will raise the standard of his company's personnel and will put him in a position to render a better, more satisfactory and more economical service to his public. It will result in the application of brains, modern methods, research and high purpose to his industry, all of which follow in the wake of a well-selected and well-educated personnel. His business will develop scientifically and will grow more rapidly than it would possibly have an opportunity to do if served by mediocre and poorly trained people.

Recognized Mutual Interest Sixteen Years Ago

These are not new thoughts. Sixteen years ago the suggestion was made that relations should be developed between the electric public utilities and the great institutions of learning. A committee was formed, composed of professors from a number of the prominent universities and colleges and men prominent in the electric light and power industry. The reason for this desired relationship was that the electrical industry was at that time growing at such a rate and furnishing a service of such great usefulness to the people that those engaged in it began to have some vision of what it was likely to become and to realize that not only should the institutions of learning be familiar with it and up to date with regard to it, from the standpoint of general useful information to the great body of their students, but that the industry was requiring more and more college-bred men to take up its work. It was of the greatest importance that there should be closer relations between the educational institutions and the industry so that these young men would be prepared in a way to make them most useful in the industry in the shortest possible time.

The first work of this committee was directed toward accomplishing four things:

1. Assisting faculties, by consulation and suggestion, in the choice of studies for their curricula covering their electrical course.
2. Working out plans by which more of the undergraduates could get summer work of a class which would be of some value to them from an educational standpoint and at a fair compensation.
3. Furnishing to the libraries of the universities copies of worthy and valuable pamphlets and books bearing on the electrical industry.
4. Arranging for an interchange of lectures by electric light men before faculties and student bodies and by members of the faculties before groups of utility employees.

While the primary importance of this relationship between the educational centers of this country and the utilities is the securing of properly trained people for the utilities and the interchange of information which is essential to intelligent prosecution of that work, it is realized by the committee, and was by the original committee, that there are matters of general interest on each side which should be known to both parties; and to the utilities particularly it is of tremendous value to have the benefit of the unbiased views of these men of broadest attainment who make up the faculties of our schools.

I fully realize that this relationship between our industry and the educational institutions has been challenged as something improper by certain men in public life and a certain section of the public press, but if we are right in this matter, and I do not think any unbiased person who will take the trouble to learn the facts will think otherwise, this should not deter us. Such opposition is, on the whole, wholesome, and despite the fact that many of the statements made by this opposition lack truth and most of the others are grossly extravagant and misleading, they do tend to develop discussion and careful consideration, and will finally without doubt be found to contribute somewhat to the universally approved plan in the public interest which will ultimately be worked out.

High Lights in Engineering

Brief abstracts of report of engineering committees. Economic aspects dominate work. Trends in equipment and practice

By E. C. STONE
Chairman Engineering National Section

"MORE system capacity per dollar of investment" continues to be the principal objective of the Engineering National Section. The secondary objectives chosen as means of attaining the major objective include definite planning of system development, comprehensive engineering research, constructive co-operation in the standardization movement and recruiting and training of adequate engineering personnel.

E. C. Stone

"More system capacity per dollar of investment" is emphasized because of the increasingly important part that fixed charges are playing in the total cost of electric power service. With fuel efficiency at its present high level, the cost of generation has become almost a minor item, so that system investment now offers the greatest field of opportunity for further major economies. In the past attention has been centered on reducing fuel and other operating costs. In the future it will be devoted particularly to economical system design and control of construction costs.

Two major problems of power system engineering —system stability and lightning protection—have received much attention during the past year. Increasing interest in these subjects is logical, in view of the constantly increasing importance and volume of the power companies' business.

Careful analysis of stability troubles by operating companies has thrown considerable light on the problem, but there is necessity for much further study. Instability may develop under conditions of normal system operation when the impedance of the transmission circuits is high in relation to the load involved, as in transmissions over very great distances or where relatively small line capacity is used to connect power plants for parallel operation. For improving stability in these situations high-speed excitation and power-factor control are the most effective means. Instability may also occur under short-circuit conditions in all systems. Under these conditions the means available for improving stability are the use of generators with high short-circuit ratio, the maintaining in operation of proper relation between voltage, power factor and load on generators, and the introduction of reactance at strategic points in the system. In many cases generators must be operated at or below 90 per cent lagging power factor in order to obtain a safe margin of stability. High reactance is often placed at strategic points in the transmission system to limit to a portion of the system the disturbance and accompanying instability effect of a short circuit.

The only other means in sight at the present time for accomplishing major further improvement in system stability is quicker interruption of short circuits. It is therefore to be hoped that high-speed circuit breakers and appropriate methods of selective relaying will be developed.

In lightning protection the laboratory and field tests made by the manufacturers during the year have brought forth much enlightenment as to the true character of lightning discharges over transmission lines. Laboratory tests have developed more facts with respect to the breakdown voltage of insulation under lightning discharges. Manufacturers are in close agreement as to the ideal for lightning-arrester performance, and arresters are now built within reasonable approach to the ideal. The adoption of standard wave forms for comparative tests of lightning arresters and the development of standard test procedures will make it possible to buy this class of apparatus under logical specifications such as are available in connection with the purchase of other kinds of electrical apparatus.

The problem of standby capacity needs careful study. The relation of installed capacity to load in all parts of the system should be based on accurate knowledge of operating conditons, and much more data are needed on the service availability of equipment and probabilities of simultaneous breakdown on different parts of the system.

Other basic system engineering problems requiring

further study include control of plant frequency and of load distribution on the transmission system, voltage regulation, selective relaying and methods of grounding the system neutral.

Prime Mover Developments

The prime movers committee reports that there has been no material change during the past year in steam pressures and temperatures. While several new plants or extensions are under way to be operated at 1,400 lb., most of the new installations are for pressures of 400 lb. to 500 lb. The pressure used in any case is mainly dependent on local conditions, including cost of fuel and operating load factor. The rise in steam temperature seems to have halted at about 750 deg. F. pending the development of new alloys for higher temperature service.

The size of individual boiler units has kept pace with the increase in size of turbo-generators. Several boilers having a maximum capacity of 800,000 lb. to 1,000,000 lb. of steam per hour will be in service before the end of the year. Each of these boilers will be capable of serving upward of 80,000 kw. of turbine capacity. The almost universal use of water-cooled furnaces, particularly in connection with pulverized-fuel firing, has very largely decreased boiler outages. One large station so equipped has operated for the past eight months with a service demand availability of 100 per cent, thus indicating that power plants may yet be built with only one boiler per turbine.

The present limit of individual stoker capacity seems to be about 500,000 lb. of steam per hour. There is no indication, however, that the limit of capacity for pulverized-fuel furnaces is in sight.

An extensive survey of the operating records of both single and two-pass condensers has been made. No decided advantage is shown for either type. On the average, heat transfers of about 80 per cent of the makers' guarantees are realized on both types under operating conditions.

The operating history of large turbines has been brought up to date. A slightly improved record is shown, but the improvement is not sufficient to be significant. This operating history, which has now been kept for a number of years, is of particular importance because of the light it throws on the availability for service of installed generating capacity. Obviously accurate knowledge as to the expectancy of outage to generating machinery will permit of more accurate determination of the installed capacity necessary to serve given loads.

Interconnection Operations

The electrical apparatus committee has given much study to the apparatus problems associated with satisfactory operation of interconnected power systems. Further developments of interconnected operation have imposed the need for further study of the engineering problems associated therewith. In this connection the necessity was brought out of basing interconnected operation of the systems of different companies on a form of business agreement sufficiently flexible not arbitrarily to force an operating scheme along uneconomic lines.

The control of system frequency has become a major problem. Automatic systems of control are available, based both on indicated and integrated frequency. Further study and experience will be necessary, however, to determine the most desirable method, although it is reasonable to suppose that in the end automatic frequency control will be generally adopted. Phase control at strategic points in the transmission system is being found desirable in certain instances either for the purpose of distributing loads in accordance with line capacities or in order to make possible the observance of contractual limitations in complicated interconnected networks.

This committee definitely expressed itself in favor of operation of electrical apparatus on a temperature basis by approving the proposed operation standards of the A.I.E.E. for transformers as a suitable basis for securing experience on the effect of operation of transformers at ambient temperatures other than 40 deg. C. for air and 25 deg. C. for water. It is to be expected that standards for operation on a temperature basis will be developed for other types of electrical apparatus as rapidly as the necessary basic data can be obtained and agreed upon. This should result in a substantial increase in efficiency of use of electrical apparatus.

Fractional Horsepower Motors, Starting Current and Generator Voltages

Time delay undervoltage release devices, now available for the protection of motors, will prevent in most cases the shutting down of motors on drops in system voltage such as result from line short circuits. For this reason their use should be encouraged, and it is to be hoped that in due time they will generally replace the older and less effective instantaneous type of low-voltage release.

Fractional-horsepower motors having characteristics satisfactory for operation on lighting circuits, as specified in the agreement reached last year between the manufacturers and our representatives, should be available in the very early future to the manufacturers of electrical appliances without additional cost. It is of fundamental importance to the satisfactory performance of power systems that motors with these improved performances be generally used, and all member companies are accordingly urged to exert their influence toward the general adoption of such motors by appliance manufacturers. The adoption of appropriate motor rules by member companies will promote this desirable end.

Further attention was given to the matter of motor-starting currents. It is recognized that starting-current rules must be based on the combined cost of the motors themselves and the power system required to serve them, in order to give to the user the minimum over-all cost of power. Furthermore, the size of a motor in proportion to the total load fed by one service has a major bearing on the problem. The starting current of a small motor in a large installation is of no importance to the power company, but if a motor is practically the total load on a service connection, the starting current may necessitate an increase in the power company's facilities.

In generator and synchronous motor design there is a trend toward higher voltages, and machines for 16,500 volts and 22,000 volts have been built. Two 22,000-volt generators have been in service in the humid climate of India since 1918. Double-winding generators are being employed where large currents are to be carried, the advantages being reduction in short-circuit kva. to one-half, additional synchronizing power and reduction in cost. The use of hydrogen for cooling has been developed for synchronous condensers and has the advantage of increasing the capacity of a given machine about 35 per cent. Investigation shows that the proportions of hydrogen and air which will cause an explosive mixture are such as to make explosion quite unlikely.

J. W. Sylvester
Chairman Underground Systems Committee

H. Cole
Chairman Overhead Systems Committee

Byron E. White
Chairman Hydraulic Power Committee

E. E. Hill
Chairman Meter Committee

Outdoor metering has received considerable attention. It is the opinion of the committee that with the modern temperature-compensated meters, outdoor metering is entirely practicable wherever local conditions may warrant. This method should prove useful in connection with rural-line extension, summer resorts and transiently occupied homes, places difficult of access, and in general in locations where climate and operating conditions make it feasible and economical.

The trend of modern meter installation practice provides metal inclosures for all service boxes and metering equipment between company mains and the load side of the meters. The advantages of metal inclosures have become generally recognized, because they minimize accidental damage, make tampering more difficult, provide additional safety and aid in standardizing meter installations.

The underground systems committee reports improvement in the quality of cable as manufactured. The percentage of deficiency is lower; dielectric strength by short-time puncture tests is somewhat higher; insulation resistance, power factor and ionization factor are distinctly improved. It is not yet possible to predict with certainty from the tests made during manufacture whether cable will give satisfactory service, but research investigations are under way to determine the nature of cable deterioration and to develop methods for indicating beforehand whether cable is going to be satisfactory in service.

C. R. Beardsley
Chairman Accident Prevention Committee

It is obviously desirable to determine accurately the maximum loads that cables can be depended upon to safely carry. In this line progress has been made toward the development of accepted methods of determining cable operating temperatures, so that future tests and investigations by various operating companies can be compared upon a common basis and data presented to the industry that will make possible the maximum utilization of cable investment with resultant lower cost per kilowatt in the underground system.

Reports for the year indicate a decided improvement in the operating performance of cables, joints and pot heads, particularly in cables operating at 20 kv. and above. Over two-thirds of the cable failures are due to external causes, and probably half of them could be overcome by greater care on the part of the operating companies. No failures occurred in oil-filled cables. Single-conductor cable showed the lowest rate of failure from internal causes, followed by three-conductor shielded and three-conductor belted. Operating experience with alternating current low-voltage networks continued satisfactory. Most of the companies are using single-conductor cables on their secondary systems and depending on clearing secondary faults by burning off the cables. Experience so far indicates little difficulty in clearing faults in this manner where the mains are tied in solidly.

Fireproofing of cables in manholes has become accepted practice, and although

H. P. Liversidge
Chairman Engineering Administration Committee

C. F. Hirshfeld
Chairman Special Engineering Research Committee

E. B. Ricketts
Chairman Prime Movers Committee

H. L. Wills
Chairman Inductive Co-ordination Committee

there is no uniformity relative to material used, generally satisfactory results are reported.

Extensive research in cable insulation is being carried on both by manufacturers and operating companies, but there is still a great deal to be learned regarding the effects of intrained moisture, occluded air, nature of impregnating compounds and processes, use of special gases as inhibitives to ionization and nature of paper on cable in service.

Status of Research to Be Advanced by Co-operation

The special engineering research committee, after making a comprehensive survey of the status of engineering research in the power industry, finds that there exists considerable duplication of effort which is wasteful of time and money, although entirely unavoidable under the circumstances. The Committee therefore concludes that proper co-ordination of research work in the industry cannot be obtained unless a paid secretary is installed at headquarters and provided with ample funds to defray traveling expenses. The duties of such a secretary, who would naturally be placed in the headquarters engineering staff, should be to maintain a complete file on research projects of interest to member companies and to keep informed regarding their progress, to arrange for adequate publishing of information regarding results as rapidly as they can be made available, to arrange for the initiation, placing and financing of new and desirable research projects, and in general to do all that a staff member can do to co-ordinate and guide research work so that it will be of maximum use to member companies. The general situation in respect to engineering research in the industry is such as to make the adoption of this recommendation of primary importance. The executive committee of the Engineering National Section has approved it, and it is earnestly hoped that appropriate provision for carrying it out will be made in next year's budget of the association. It is also recommended that the special engineering research committee be continued next year.

Economic Responsibility Is Placed on Engineers

The vast amounts of money which are being expended every year in the generating and distributing systems of the power companies impose an ever-growing responsibility on its engineers. Broadly speaking, power-system engineers determine and specify how their company's money shall be spent. The exacting demands for the highest possible grade of service and the economic pressure to get the greatest possible value out of every dollar spent puts up to the engineer an even bigger job than he has had heretofore. The objective of the Engineering National Section of "more system capacity per dollar of investment" tersely expresses the problem.

The years immediately to come will bring to the electric utilities a closer approach to saturation in available business and greater competition from other power sources than have heretofore been experienced. For this reason the power industry at the moment is particularly interested in commercial development. The engineer will play an important part in the new-business program by indicating the character of load building that will most effectively use the system investment and by furnishing costs of the various classes of service to be used as a guide in making rate structures.

In many cases it will be necessary to broaden existing organization if their engineering is to be done in such a way as to accomplish the most efficient use of the dollars spent for power-system development. It will be necessary to set up places for those engineers who are to carry on the necessary development work. Mature judgment based on experience is necessary, as well as inherent ability to work out the problems involved. Hence provision must be made not only for the selection of engineers of the necessary ability, but also for their continuing service over a period of years, through recognition, by adequate step-by-step promotion, of their ability as it develops. Then there must be sufficiently attractive opportunity at the top to make it worth their while to stay in the game.

In the past the requirements of the rapidly expanding power industry for executives have diverted many, if not most, of the industry's best engineers into executive channels just at the time when if they had remained engineers they would have brought the biggest dividends to their companies.

It is to be hoped that in the future it will be possible to retain in the engineering work more of the engineers who have shown unusual ability, in order that their judgment and experience may be applied to this problem of ever-growing importance, the most efficient possible use of the dollar spent in the power system.

Government's Place in Industry

By David Lawrence
President The United States Daily

OUR whole politics is colored with economic conflict. We are concerned now in government with a proper balance between government and the economic growth of the country.

The most significant movement of our times is the trade association movement. Say what you will, if you are the literary cynic who talks about the Babbitts, we know that the progress of this country is directly related to the trade organizations and the units that have been built up in business for the exchange of ideas. We know, too, that trade associations have become the greatest influence in the elimination of waste, in bringing about better understanding of industry among competitors within industry. We know, too, that government has played a part in bringing together discordant elements within industry. The time will come, in my judgment, when the government will be able to serve in a co-operative influence even in your industry. . . .

It is that particular function of government, the extention of its aid in stimulating an industry and assisting it in reaching out for its markets, which is a proper function, and about which there can be no debate. It is on the question of the regulatory side of government that we have differences of opinion, but there, too, as I said at the outset, I think you will find in the long run that the pressure of time will transform that influence into a co-operative influence.

And in the period in which we are now living, the period that is coming, the government's power to influence the situation will not diminish, in my judgment. No subject is more vital to us today than the regulation of credit.

Railway Electrification

By George Gibbs
Consulting Engineer, New York

Traffic conditions influence decision. Methods of application for trunk lines. Purchased or generated power and power contracts. Economic considerations

THE latest most far-reaching plan of the Pennsylvania Railroad Company involves full divisional main line electrification for all services on its four-track main line from New York to the South and West. It is by far the most extensive and costly project of the kind yet undertaken anywhere in miles of track to be electrified, in volume and density of passenger and freight business handled and in size and amount of equipment required. It will be done in sections; the first, from Philadelphia to Wilmington, is now complete; the second, from Philadelphia to Trenton, N. J., is under way; the other sections will follow immediately. The work is to be completed for through passenger trains hauled by electric locomotives at the time the new main passenger station at West Philadelphia is ready for service, and for operation of all suburban services by motor-car trains into a new underground terminal adjoining the present Broad Street station. It will enable longer passenger trains and much heavier freight trains at higher speed to be operated. This means an important saving in time and a clearing up of existing congestion on the New York division. By making, at the same time, improvements in freight terminals and yards new and desirable operating methods will be possible. All of these changes will, it is figured, result in large direct and indirect economies and will increase business, especially in perishable commodities, and thus bring additional revenue to the company. This important electrification project may, therefore, be said to be for economy, for relief of congestion, as a revenue producer, and for the handling of through passenger service into two underground terminal stations (New York and Philadelphia) without change of power en route. The results, economic and otherwise, of this great undertaking will be watched with keenest interest by the railway world.

These enterprises of the Pennsylvania Railroad illustrate the progressive steps taken to develop heavy electric traction for all kinds of traffic, and for the general reasons which have usually guided railways in taking up such enterprises. As further illustrating the capabilities of the new motive power, there should be mentioned the installations on the Norfolk & Western and the Virginian Railways over the Alleghany Mountain grades. These—especially the latter case—employ the heaviest train units operated anywhere in the world. The Norfolk & Western electrification has been in successful operation since the year 1915; the Virginian started electrical operation in 1925. The reasons for both of these undertakings were the expected superior economy of electric traction for long freight train operation over heavy grades, the possibility of increased running speeds, and the consequent elimination of congestion at critical points on the lines. In these cases the roads were obliged to obtain in some way increased capacity at certain points which constituted "bottlenecks" in the divisional operation. Electrification obviated the necessity of undertaking track additions in a country where this would be unusually expensive, so that the estimated cost of the otherwise essential double-tracking might be considered as a credit against the cost of electrification. Under such circumstances the direct savings from electric haulage, for the volume of business conducted, have more than carried the additional fixed charges and made the electrifications directly profitable.

There is one other special field in which electric haulage has been found efficient and economical, and that is in freight yards for shunting and classification purposes. In such work electric locomotives are greatly superior to steam shifters in ease of control and prompt starting characteristics—a matter of importance in making short runs and numerous cuts; they are, also, very economical, because they waste no fuel when not in motion. Electric shifting has been most largely employed up to date by the New Haven Railroad Company in one of their terminal yards. A profitable future field for yard operation by electricity will doubtless be found on many railways.

Present State of the Art

It is evident that electric haulage has been tried out for every condition met with on steam railways; it has demonstrated by years of trial that the present development and perfection of apparatus from the power house down to the propelling wheels of the train will produce reliable and useful results from an operating standpoint; it is an efficient tool for railway use in effecting economies, and is often a "business getter."

The first cost of electrifying a railway is very great. Speaking in very general terms, the equipment costs may be divided roughly into three parts, each of substantially the same magnitude, namely, one-third for the power generation, transmission and conversion; one-third for the distributing and contact elements; and one-third for the motive power on the trains. All of these are, naturally, subject to considerable variation, in accordance with the traffic and physical conditions of the particular railway. In addition, the application of electric traction requires a more or less extensive track rearrangement, the acquisition of additional real estate, changes in or removal of many structures, and radical changes in signal and communication systems. These taken together add a considerable sum to the first cost of an electrification.

It is because of high first cost that the progress of electrifying steam railways has been quite slow; even if the superior economy and the indirect advantages re-

sulting could be shown to warrant the departures from steam traction the prodigious outlay of new capital required has often made the change impossible. The direct economies secured from electric traction are practically all in fuel saving, in train labor and in cost of repairs of motive power. These direct economies are produced in part by changes in operating methods, that is, by using heavier and fewer trains for a given volume of traffic and the elimination of stops, such as for coal and water; the saving is further influenced by changes in train speeds. All of these direct economies taken together may amount to a considerable sum, but unless traffic is very dense or the conditions very peculiar and favorable, such as heavy grade work, they will, unfortunately, not be found sufficient to pay a profit over and above the additional fixed charges which the railway must assume for the new equipment, and will sometimes not carry the charges, even.

Agitation aimed to force railways to electrify should be discouraged; especially legislative enactments passed with little or no regard to cost or results. Such will only delay progress in meritorious projects. Thus, a number of years ago an ordinance was passed in Chicago compelling all railways to electrify within the City as a smoke abatement expedient. An impartial investigation of the probable results to both contending parties, by a Committee of the Association of Commerce, showed that as regards smoke production the railways stood fourth on the list of industries in the city. The elimination of the steam locomotive would, therefore, not improve atmospheric conditions in very marked degree. As regards costs, the report showed that electrification within the city would cost on a pre-war basis, $190,000,000 and the "precipitated costs" outside $96,000,000 additional; these figures would be doubled, at least, now. The net yearly saving possible was shown to be only $2,337,000. This meant an annual deficit of $14,610,000—a huge continuing burden sought to be placed upon the railways and the public. Fortunately, the report was convincing and killed the project, but the whole incident has made the railways there hesitate to undertake any electrification for fear that a start would entail being forced to extend it beyond their ability to assume the burden.

A similar situation confronts the railways at present in New York State. The enactment of a legislative act seeks to compel them to discontinue the use of steam by completely electrifying all lines and services within the limits of cities of 1,000,000 or over population. As an example, this means for the Long Island Railroad alone an expenditure of $23,000,000, of which about $10,000,000, would be required outside of the city to make such service usable. This is a staggering burden for a small road and must be assumed in advance of any real need for it or a sufficient practical return to any one.

All this sort of thing is very discouraging as regards real progress; railway companies should be trusted to adopt electric traction where it will increase comfort and attract business, or will reduce expenses so as to better meet decreasing rates and competition from other methods of transit. I am sure this association can be relied upon to favor this point of view and to oppose tendencies of a kind which may injure the railways.

The services to be met are various, and introduce different load conditions; suburban traffic loads have high morning and afternoon peaks, the latter corresponding to commercial lighting peaks and coinciding roughly in time; heavy grade work especially for freight shows peaks occurring at random, due to the starting and bunching of long trains; accidental peaks occur in all services, due to congestion of business and power derangements which may occur at any time in any electrification and may spread over several hours' time. There may be, furthermore, abnormal passenger train peaks as the result of special movements, such as race meets, excursions and the like. As electrification extends on a road and becomes divisional and is used for all services combined, the normal power curve smooths out and the load factor improves, but seasonal variations will occur.

The railway companies are much interested in light and power development, and in every sense of the word they wish to encourage them; it means cheap power for commercial purposes and the expansion of industry, which brings business. But it should be recognized that it will generally be detrimental from the power company's standpoint, to allow railway loads to be taken at random points on their distribution systems. Such loads, both as regards the power company and the railway itself, should be treated as block supply at a few points and as far as possible delivered on lines directly connected to the main load centers or power plants.

Discussing now the conditions under which a railway company can make use of this railroad power supply; it is obvious that the energy furnished must be suitable, reliable and cheap. As to reliability, it may be conceded that a centralized commercial power system meets this essential. So does an up-to-date railway power plant; it has been found dependable. I should be willing to bank upon either. It has often been pointed out that purchased power is produced by specialists while railway power is not. This in a sense is true, but in another it

Conditions Confronting Power Companies in Selling Railroads Power

(George Gibbs)

Capital Costs—Due to plants in populous centers and ultra-refinements to secure high economy. Railroads can locate plants in cheap locations adjacent to right-of-way and minimize distribution costs.

Interest Charges—Relatively high interest paid for capital by power companies, and high taxes, become part of demand charge.

Staff Expenses—Railway has low management expense chargeable to power cost.

Load—Suburban traffic peaks coincide with power companies lighting peaks. Requires combination of passenger and freight traffic to get good diversity factor.

Spare Capacity—Railroads provide less reserve equipment than power companies for extraordinary emergencies.

Demand Charge—Railroads object to high demand charge when emergency needs can be supplied by otherwise unused generating capacity of power company.

is not; railways have always specialized in power; every locomotive is a power plant; they surely can care for the central plant of an electrification. The question is, will they? Unfortunately (or fortunately, as you choose to look at it), it is difficult to bring this about. The power house is an incident only in a complicated chain of factors making up the production of transportation, and the importance of keeping a power plant up to maximum efficiency and of taking advantage of progress in the art, not always fully understood by the higher officials who are responsible for expenditures. It is difficult, therefore, to get prompt authorization for large expenditures for modernization. With commercial companies, on the other hand, the power house and its successful operation are major considerations; the man in charge is a manager of the business, not a minor officer, reporting through the various departments up to the official who controls policy in making large expenditures.

The next point which should be referred to is that the purchase of power will relieve the railway company from a considerable capital expenditure for a plant of its own, and the periodic and heavy expenditures for modernization. These are undoubtedly advantages and constitute an inducement for a railway company to buy its electrical energy but these advantages are not reflected in power costs, as interest and depreciation charges accrue in either case and are elements in cost.

The third and most important consideration, however, is the final cost of energy delivered at the railway distribution system. If the electrification is a minor one, requiring a limited amount of energy, a small plant only is needed and this cannot compete in production cost with a large one. But in the case of a large and growing electrification, the fact should be recognized that a railway company can design and build a large modern plant of its own, at a reasonable cost and can secure from it cheap and reliable power. Therefore, for an outside company to compete as to energy cost it is necessary that it should have in mind the following:

1. The effects of high capital costs of the power house, transmission and real estate. In some cases, apparently, excessive first cost has been due to the proximity of the plant to a large center of population; in others to an ultra-refinement of plans, aimed to produce energy at the lowest possible cost. A railway company can generally place its own plant in a cheap locality, centrally to its electrification and adjoining its right-of-way, and thus, by careful planning, reduce first cost of plant and transmission, and make competition with it difficult.

2. The relatively high interest charges paid by the power company for capital. This, together with high taxes paid and sometimes franchise taxes in addition, produce a high fixed charge, which becomes a part of the "demand" rate of the contract.

3. High staff and general office charges. A railway has a very low management overhead chargeable to power cost.

4. The small benefit which a company is apparently willing to accord the railway for the "diversity factor" produced in connection with its own load. In some kinds of railway traffic, such as suburban, there is probably little diversity obtainable by the power company taking over such a load, as suburban traffic peaks coincide roughly with the lighting peaks of a power company. If, however, through passenger and the various kinds of freight services are included, there may be a considerable diversity secured and which would help out a commercial power system. A railway may reasonably expect that its own load shall be considered a unit, both as to the requirements for its different services and as to location.

5. The amount of spare generating capacity allocated to the railway load. In a plant of its own a railway company would, of course, provide for reserve capacity, but would exercise its judgment as to how far it would depend upon this in extraordinary emergencies, and how it would arrange its traffic in case of a shortage in emergencies. Commercial power companies generally go beyond this in figuring reserves, and I am not criticizing their policy; we expect them to safeguard our normal demands—perhaps more fully than we do our selves; but the railways should not be penalized for the extraordinary emergency conditions heretofore mentioned by the establishment of new and higher "demand" charge. In other words, the railway should be able to obtain extra emergency power at "energy" cost, if and as the power company may have the capacity to supply it. It is not intended to ask that spare capacity be set aside for these occasional extra demands, in fact, many times the emergencies would come on the power company's off-peak times, but if the company has unused capacity during the emergency it should give it to us; the contract should not be punitive. If this policy be followed it would tend to reduce a high demand rate of the power company, and make purchased power more attractive to the railway.

Typical Contract

The manner in which these various essential provisions for the production of low cost power to the railways have been incorporated in an important existing contract is summarized in the following:

1. The charges or rates are based on the actual cost to the power company of producing power in its generating stations and transmitting it to the railway supply points. This "actual cost" includes fixed charges, general expenses and all other items properly entering into the total cost, but it is based on production in large modern plants, not counting old and small plants, and is also based on certain allocated portions only of its transmission network.
2. In order that the railway may be protected against any unforeseen high cost of energy, such as a radical change in company set-up, the power company guarantees that the demand charge and the energy charge shall not exceed certain fixed values. Such guarantees are based on specific costs of coal and labor. Maximum rates for fixed charges are also stipulated.
3. The demand is determined monthly and is based on three maximum normal clock hours per month, with the stipulation that the demand in any succeeding month shall not be less than 75 per cent of any previous monthly demand.
4. Abnormal demands resulting from accidents, derangement of power supply, abnormally heavy traffic or unusually severe winter weather conditions are disregarded in determining the monthly demand.
5. If more favorable terms are subsequently made to other consumers under similar conditions of supply, the railway shall be entitled to the lower rates.
6. Power may be supplied at several points, but the demand is determined by combining the readings at all points; in other words, the railway gets the benefit of its own diversity factor; proper allowance for the company diversity is also reflected in the determination of the demand charge.

"Switzerland has the highest percentage of line electrified, namely 43½% per cent . . . and the United States only three-quarters of 1%."

BRITTON I. BUDD

Science and Progress

in Industries

Large portion of success in electrical industry is attributed to research, and problems confronting researchers if future progress is to be most rapid are cited

By General J. J. Carty
Vice-President American Telephone & Telegraph Company

J. J. Carty

ONE of the outstanding factors in the success of the electric light and power industry is its encouragement and support of laboratories for research in applied science. In the operation of these laboratories millions of dollars are expended each year and thousands of men are employed, including engineers and scientists distinguished for their achievements in many departments, including physics and chemistry. They have perfected generators, motors, transformers and prime movers. They have made contributions to transportation, commerce and industry. Every individual, whether on the farm or in the office or workshop, whether at home or in a hospital or at church or in the theater, is receiving the benefits of these achievements.

Trustworthy figures show that in the United States alone during the year 1928 the total expenditure by the public for lighting by means of the incandescent lamp was, in round figures, $600,000,000. If that same amount of illumination had to be provided by means of the best carbon light of 1907, then more than four times as much electrical energy would have been required, and the bill for lighting which the public would then have to pay would be multiplied accordingly. The $600,000,000 would become $2,556,000,000. Were it not for the reduction in the cost of the generation and distribution of electric current which you have brought about since 1907, this figure would have to be increased by $300,000,000. From this it will be seen that the total reduction due to these items alone is now well over two billion dollars a year.

Without these reductions in cost a large proportion of the public now enjoying the benefits of light and power would be wholly deprived of the advantages which they now derive from your service. The remainder of the public which would still be carried on your books as customers could not afford to use the electric current in such large quantities as they now do and to employ it in such a great variety of useful and profitable ways.

The slowing down of the industrial and other activities of the country which would have resulted from such a curtailment in electric service would connote an economic loss which it is impossible to state in pecuniary terms Whatever it may be, the sum which represents the debt of society to your industrial scientific laboratories must be so large as to be almost incredible.

Countless practical problems now confronting mankind never can be solved by the applied scientist in the present state of scientific knowledge. He must await further fundamental discoveries and new scientific generalizations yet to be furnished by the investigator in pure science. Unless the work of the pure scientist is continued and pushed forward with ever-increasing energy, the achievements of the industrial scientist in the course of time will become more and more restricted. Already the applied scientists have perfected your dynamos and motors and transformers so that they are working at 95 per cent of their theoretically perfect efficiency.

While without any increase in our present stock of knowledge in the realm of pure science, the applied scientists would find abundance of profitable work to do, nevertheless in the long run they can proceed no faster than the discoveries of pure science permit. It is of the greatest practical importance, therefore, that we should do everything in our power to encourage and support the work of the pure scientists who are to be found in all of our universities and scientific institutions. The discoveries made by these learned men have no immediate practical value and could not therefore bring to them or to their institutions any pecuniary return. Unlike applied science, pure science cannot support itself. It must depend upon contributions of money from the public, from far-sighted patriotic citizens and men of affairs, from business and commerce and the industries which derive their prosperity or very existence from this field of human endeavor.

If pure science is properly supported, the discoveries

of the future will be enormously great in comparison to those which have already been made. Future generations of Americans may look upon us, with our present limited knowledge of the forces of nature, as we now regard the North American Indian, who, cold and shivering in his scanty clothing, was ignorant of the coal at his feet with its stores of heat and power.

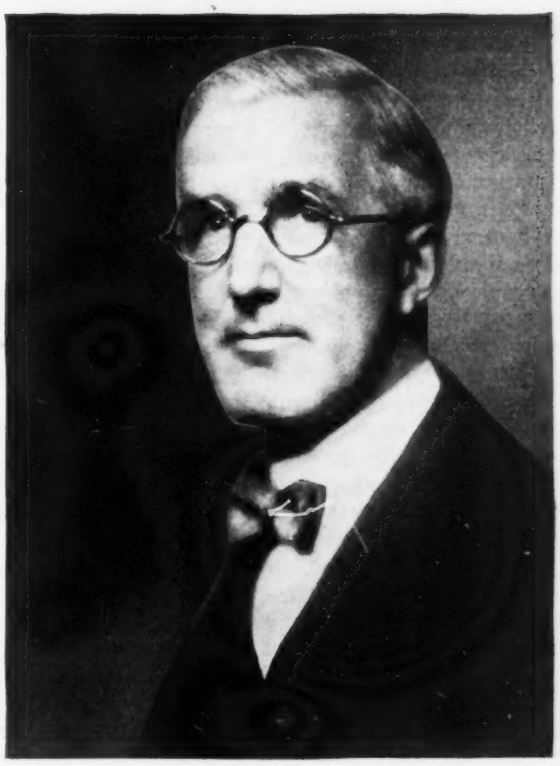
Although seriously hampered and restricted by the lack of funds, American investigators in pure science are pushing forward their work with courage and determination. Among the thousands of problems which occupy their attention, they are attacking the most fundamental of all—the ultimate constitution of matter, the structure of the atom and the nature of the electron. On the summit of Mount Wilson in California the astronomers are observing in the sun and in the stars and in the nebulæ not only worlds in process of evolution, but what is most astonishing, the evolution of the chemical elements themselves. In laboratories at the base of the mountain chemists and physicists are reproducing with increasing success conditions which have been discovered in the depths of the universe. They are splitting the atom into its parts, and their work is filled with the greatest promise. From it I believe they will learn how to take the elements apart and put them together again in new and most remarkable combinations.

I believe that in the course of time, if these investigations shall have been carried forward to success, our applied scientists will be able to provide new structural materials and metallic alloys, lighter or heavier, as may be desired, cheaper and more durable and capable of resisting corrosion. Researches such as these will give us the answer to the great problem of drawing upon new sources of energy and of utilizing those already available with the highest economy and efficiency. No inquiries could go more deeply to the foundations of industrial progress than these.

American business and commerce and industry, and the whole of the American public, are being asked to give and to continue to give to pure science research, in our universities and elsewhere, that support which it so greatly needs. For all the benefits which it is conferring upon us science asks only that we provide its faithful workers with an opportunity to multiply their efforts in our behalf. Upon the answer to this call depends the future prosperity of the nation.

Many Rate Forms Objectionable

Judge Ransom urges choice of the kind that will encourage full use of electricity in homes



W. L. Ransom

REVISION downward of electric light and power residential rates was urged by ex-Justice William L. Ransom of New York in discussing the topic "The Public Right as to Electric Rates."

Stating that "there are signs of a growing public interest and consciousness as to electric rates, their forms and their economic consequences as limitations on the service which electrical energy may render," and stating that in his opinion "it is fitting that in this representative association of the industry an effort should be made to perceive what the public has a right to expect as to the rates which it pays," Judge Ransom summarized what he regarded as the most important rate problem confronting the industry. In brief, it included the following:

1. Existing rates do not yield excessive revenues. Net earnings of the companies are less than their constitutional right.

2. Present rates and rate forms exclude electricity from many possible uses.

3. Utilities could afford to serve these full-use consumers at rates within their reach. This would, of course, not decrease the net revenues of the utilities.

4. This suggests that if a consumer pays 6 or 7 cents a kilowatt for a small amount of current while he would be glad to use a much larger quantity for labor-saving uses for which he could afford to pay an average of 3 cents, the rate schedules are seriously at fault, provided the company could afford to supply him the larger quantity of energy at the price he could afford to pay.

5. Perhaps the most responsible factor is the form of rate under which all these full-use customers, regular and substantial users of current in the home and factory, must make good the heavy deficiency incurred in serving many casual, convenience or limited users who wish electric service kept continuously available to them but do not wish to use it in regular or substantial quantities throughout the year. This anomaly has produced the condition under which a rate structure yielding less revenue than the company is entitled to produces kilowatt-hour rates so high as to penalize the regular and substantial users.

Rates and Salesmen

Needed for Merchandising

Abstracts of notes of several groups. Good trade principles urged. National refrigeration plan adopted. Water heaters and ranges

By F. D. PEMBLETON
Chairman Merchandising Bureau

THE increase in residence energy consumption is to a large extent dependent upon a much more general use of a large variety of appliances. Therefore it seems obvious and logical that the whole central-station industry, particularly the executives, should immediately take a more earnest attitude toward the electric appliance business and aggressively promote it in a comprehensive manner that eliminates indifference and mediocrity.

A well-organized and properly managed merchandising department completes a central station's whole service to its customers. Because it is a part of the company's service and because it has such a direct and powerful influence in presenting the company to the public, the merchandising department of a central station should be just as carefully and completely equipped as its generating station. Both form a part of the basis of the company's service to its customers.

A central-station company's merchandising methods are, or should be, based upon principles that are just as irrevocable as the principles underlying its engineering practices. Results in merchandising can now be predetermined with a remarkable degree of accuracy. All central stations should, with enthusiasm and pride, spend the money necessary to equip their salesrooms with the most modern store fixtures in a manner that compares very favorably with the stores of other merchants.

Central-station salespeople should be so thoroughly educated regarding electric appliances and so well trained in the art of selling them that they will be far more expert in the sale of electric appliances and render a much more satisfactory sales service than the salespeople of other merchandisers. The public expects such ability and sales service from the central station's salespeople.

A central station's advertising on appliances should be the product of professional experts and never that of one untrained in advertising. Through its merchandise sales force a central station makes a very large part of its customer contacts. With a more whole-hearted interest in electrical merchandising on the part of the executives of central-station companies, their respective merchandising departments can be made to win admiration for their company's efficient methods and to develop a very great degree of good will and predisposition favorable to the company, because it is through the medium of appliances almost as much as through the medium of lighting equipment that the company's service is interpreted to the customers.

In almost every large city there is some one outstanding merchandising firm which has store equipment, displays and sales service far superior to that of most of the stores in the city. These leaders illustrate the art and science to which merchandising has been developed. They set the standards by which central-station merchandising practices will be measured by the public.

If there should be too great a difference in appearances and practices between leading merchandisers and central-station merchandising departments, it will not be well for the central station. There is no reason why there should be any great difference. The methods to be followed are obvious to any one who really wishes to know. There is sufficient money and ability in the central-station industry for it to bring its merchandising departments up to the highest standards that have so far been established.

When central-station executives shall take cognizance of these facts and put their respective merchandising departments on a basis comparable with the best merchandising firms and render their customers a perfected merchandising service, there will be no real reason for criticism of central-station merchandising practices. Then the time will be advanced when every home will enjoy a more nearly complete electric service and the central station will enjoy the respect and good will of the entire community.

NATIONAL REFRIGERATION PLAN

The refrigeration committee during the fiscal year which is closing with this convention took for its work a closer co-ordination of efforts in the refrigeration industry. We found that each manufacturer of refrigeration equipment was carrying on his sales and promotion work without any regard as to the work being accomplished by his competitor. We believed that it was possible to bring the industry closer together and work out a co-operative national educational program that would tend to "sell" the American public on the possibilities of electric refrigeration from the standpoint of health and food preservation.

After several meetings of the committee a plan was formulated for the purpose of carrying on this national food preservation movement which incorporated every manufacturer, jobber and dealer interested in refrigeration. This plan, also, called for the indorsement of every national and local group interested in health and food preservation, such as National Dairy Association, Federation of Women's Clubs, Medical Association and others.

This plan was approved by the executive committee of

the Commercial Section and by the N.E.L.A. with the undertsanding that the N.E.L.A. headquarters would not only approve it but actively sponsor and direct it from headquarters through the office of C. E. Greenwood, the commercial director.

The plan stated that all finances connected with the national committee which would direct the activity should be raised through subscription by the manufacturers of electric refrigeration and iceboxes and that all local promotional expenses be borne by the local utility and all interested groups. At this writing approximately $200,000 has been subscribed to carry on this educational program and the Millis Advertising Agency of Indianapolis has been employed to assist in directing the movement.

We feel the committee accomplished two outstanding achievements—first arousing a co-operative spirit among the refrigeration manufacturers; second, securing their help in promoting this national educational program which will make our customers conscious of the fact that there is a food temperature for proper maintenance of food as there is heat temperature for comfort.

It is an outstanding opportunity for the N.E.L.A., one which should do more toward promoting better trade relations than any movement recently undertaken.

Status of Water Heating

In addition to some work in the field, water-heating tests from various sources have been studied. A short but comprehensive questionnaire has been circulated among various companies known to be supplying a considerable amount of water-heating service. Tests have been standardized so as to make them truly comparable. Arrangements have been made for tests to ascertain diversity for various kinds of water-heating equipment. The first of these tests is being made in Seattle. This part of the work will not be completed for some time, owing to the limited number of instruments available.

A complete résumé of what has been accomplished convinced the committee that a compilation of pertinent information relating to the advantages of the electric range would be acceptable, provided it was put in a brief and readable form. The committee addressed itself to this problem and at its meetings on February 5, 1929, in Detroit and on March 21, at Chicago, was developed and completely outlined this year's report which was issued in June under the title of "Marketing Electricity for Dometic Electric Cookery."

Farm Equipment Sales

The electric farm equipment market is being explored by many member companies, and the committee on electric farm equipment is endeavoring to discover and present to the industry the most effective methods of building this type of load. Its scope, for convenience, includes not alone appliances for use in farm residences but all practicable equipment for farm operation generally. It is recognized that the development of this farm business calls for specialized attention and specialized men for promoting the sales. At every point in its work the farm equipment subcommittee is closely co-operating with the rural service committee of the N.E.L.A. from which latter group two members have been drawn and assigned to the electrical farm equipment subcommittee. While the farm market developement is not an engineering job, the subcommittee has concluded that the salesmen employed by the power companies must be equipped with extensive experience or training so as to talk the language of the farmer and adapt themelves to his practical needs. This is one of the reasons why the selling activities should be so closely related to the rural electrification work of the utility.

The forthcoming report of the subcommittee will contain charts showing how the power company should organize for farm salesmanship. It will point the way for various companies differently situated in the country at large. The subcommittee will list all the applicable publications, which should be read by salesmen to fit them better for handling the market. All data as to performance value of various farm machines now on the market and which may be placed on the market from time to time will be assembled and a description included in reports to be made available to member companies.

Typical analyses of farm appliance markets are to be made and presented to member companies by the national subcommittee, indicating the basis on which sales should be made and credit extended as determined by the kind of crop or product of the farm territory constituting the market.

Lighting Sales Needed

By T. O. Kennedy

Chairman Lighting Bureau

TO MAKE electric service so universally available, the electric utility companies have invested fourteen billions of dollars in generation, transmission and distribution facilities and, in so doing, have made a material contribution to the prosperity of the nation and to the improvement of living conditions.

The industry has a greater obligation, however, than merely making electric service available. It must promote, encourage and make possible the use of that service by each customer to the maximum extent that the customer can use it for his benefit.

It follows, therefore, that in addition to the highest type of managerial and engineering ability for construction and operation, the industry must have outstanding commercial talent with vision and aggressiveness.

We will have to confess that we have done a poor job of selling our service during the 47 years that our industry has been in existence. We can take small credit for the extensive use of electric power in manufacturing. The power users themselves, quick to take advantage of every possible opportunity to increase efficiency, have applied electricity in their production processes. We did not sell our service to them—they bought it.

These industrial users, however, constitute only about 5 per cent of our total customers. The other 95 per cent, more than twenty-two million customers, are yet making but meager use of our service. Here is our opportunity and, no less, our obligation.

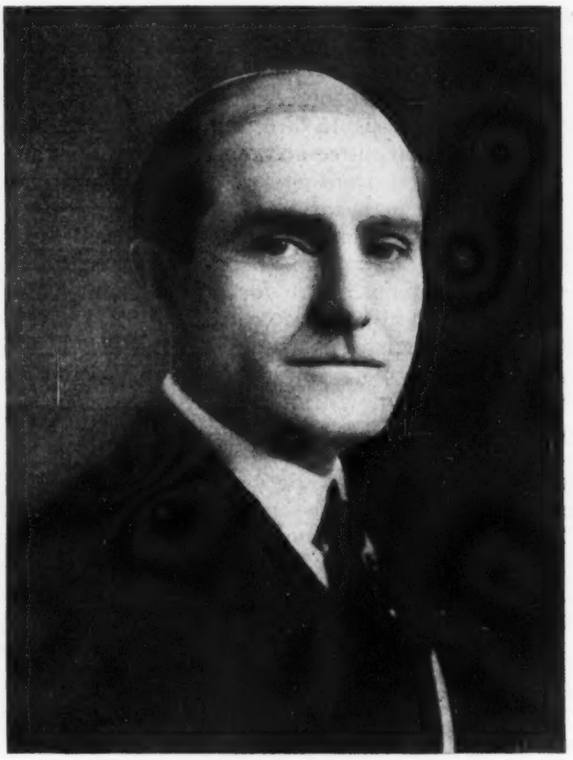
Without question, the most valuable service we have to offer these customers and the service they most lack and need is proper illumination.

The Lighting Bureau has attempted to awaken the interest of the N.E.L.A. member companies in the development of additional lighting business and has tried to formulate specific plans that could be put into effect by member companies desiring to accomplish this purpose.

Ten Thousand Miles of
Railroad Electrified

Electrification where adopted has been due to special conditions or national policy. Tendency toward closer relationship of railways and power companies

By BRITTON I. BUDD
Chairman N.E.L.A. Railroad Electrification Committee



Britton I. Budd

ELECTRIC power has been adopted to greater or lesser extent by the railroads in 29 different countries. About 10,000 miles of line are now electrified out of a total of 600,000 miles in these countries. The electrified mileage thus constitutes about 1.67 per cent of the total route-miles in the countries involved.

Switzerland has the highest percentage of line electrified, namely 43½ per cent; Morocco has nearly 18 per cent electrified, Austria nearly 11 per cent, Italy and Sweden slightly more than 7 per cent, Chile 4½ per cent, England and France about 8½ per cent each, and the United States only three-quarters of 1 per cent. Viewed from the standpoint of actual miles electrified at the end of 1928, the United States has 1,900 miles of line electrified, Switzerland 1,500, Italy slightly more than 1,000, Germany nearly 1,000, France and Sweden each more than 700, England and Austria each between 400 and 500 miles.

In the United States there are 20 railroads having some electrical operation. The length of route electrified is, as just stated, 1,900 miles; of all main track, 300 miles, and of all tracks including yard and side tracks, 4,300 miles. In the past year the Boston, Revere Beach & Lynn Railroad has been completely changed to electric operation. The Great Northern and the Pennsylvania have added considerable mileage to their previous electrifications and several new projects have been announced.

The three large electrifications now under way are on the Pennsylvania, the Reading and the Lackawanna. The Pennsylvania's undertaking is impressive and for magnitude of traffic is the largest undertaking ever turned over to electric motive power. The two other large projects are the Philadelphia suburban service of the Reading company, with 50 miles of line, and the suburban service of the Lackawanna in New Jersey opposite New York City. The latter comprises 78 miles of line. The three big undertakings together will add 450 miles of line and 1,580 miles of track to that already electrified in this country. Although all arrangements have not yet been announced, it is expected that a large amount of the electrical energy will be furnished by the power companies in the territories involved.

It is not sufficient merely to have power stations and transmission lines available. We must know something about the practical operation of railroads and must be prepared to offer them the kind of service that they need with contracts suited to that particular business. We must clearly remember that the railroads are in the transportation business and use motive power only as a means to that end.

The interest of European railway engineers in electrification is very intense, probably more so than in this country. There some special or compelling reason influences the change from steam to electricity. Several nations, like Sweden, Switzerland and Italy, do not have domestic coal resources. All these countries are well supplied with water power. This has led them to make extensive use of electricity as a national policy to develop their own resources and become independent of foreign fuel supplies while at the same time improving their balances in international trade. In each of the three countries mentioned electrification has been introduced first on the most difficult lines to operate, those having heavy grades and tunnels. The other criterion is unit coal consumption, or tons per year per mile of route.

Several of the countries in anticipation of extensive electrification and desiring to promote interchangeability have adopted national standards for electrification. England has adopted direct current with 750 volts maximum for third-rail operation, 1,500 volts for main-line service, and 3,000-volt optional for the latter in special cases. France has adopted 1,500-volt direct current for future work, with either third-rail or overhead contact, and 3,000 volts optional for special cases. The Netherlands, Belgium, Spain and Czechoslovakia also favor 1,500 volts. Norway, Sweden, Germany, Austria and Switzerland are committed to high-voltage, single-phase current

of low frequency. The trolley pressure is 15,000 volts at 16.7 cycles. Italy has a large installation of three-phase at the same low frequency. About 70 per cent of the extensive electrification in Italy is three-phase at 3,000 to 3,700 volts. All of these systems seem to be functioning satisfactorily.

In Switzerland the principal standard-gage roads are the Federal Railways and the Bernese Alps Railway. The Federal Railways have constructed, mostly since 1918, a very extensive power generating and transmission system. There are six hydraulic stations totaling 377,000 kw. and 600 miles of transmission at 66,000 and 132,000 volts. This system is also interconnected with several large power companies, although the low railway frequency of 16.7 cycles makes direct connection impossible.

In Italy there are six types of electrification used by the State Railways. They are interconnected with a large network of power companies in the north and with other systems in the central and southern parts. They buy and interchange energy and have some recourse to steam reserves in the northern part of the country.

In conclusion, we in our country can congratulate ourselves that we do not face the complications of many governments, frontiers, policies and national standards. We have but two types of electrification in the United States—direct and alternating current. Both are performing efficiently, and the power companies and manufacturers should unite in furnishing the railroads energy and equipment of whatever type they wish to purchase and on the most liberal terms and at the lowest possible cost, as the prosperity of the railroads and the efficiency and economy of their operation is vital to the welfare, growth and further development of our country.

Competition Demands Action

By V. M. F. TALLMAN
Chairman N.E.L.A. Power Bureau

IT IS important that we not only get additional power and heating business, but that we maintain all of the business which we have. That is a harder job than getting new business. The competition which we have in the power and heating business today is tremendous. It is on every hand. Our salesmen meet competition every time they go out. It may be competition in power, it may be competition with some form of heat, but it is there.

The development of the internal-combustion engine has presented a problem to our power sales engineers which makes it mandatory for us to do several things. In my opinion, every central station must give heed to its power rates. Some of those rates have not been redesigned for many years. They are obsolete in form; they don't recognize load factors. There are many things about them which must be changed. Some of them are already flat, at straight-line rates. They may be too high for the small business; they may be too high for the big business. There may be a point in the middle of those rates where they are too high to get certain medium-sized business.

Take into consideration competition where there are other forms of power-producing apparatus; take into consideration the load factor of intimate business which is obtainable. Don't forget to take into consideration the proper cost analysis to make sure that your power rates bring to you a reasonable return on the investment devoted to that class of business. If you do this, you will put into your power salesman's hands one working tool which is absolutely necessary.

To meet the competition ahead of us, closer contacts, more direct contacts, must be made. Our commercial men must know the problems of our customers just as well as those customers know their problems themselves. Our power men have to be highly trained technically; they have to be good economists in our business; they must be good economists in the business of their customers if they are to succeed in our sales programs.

Executives are urged to see that they have an adequate commercial personnel as regards power, cooking and heating. Select the best college graduates and give them every opportunity to train themselves. Give them rates to go out and sell the service. More important, tell them what your policy is, so that they will know what they can do for the customer. Encourage them to come back to the office with the customer's viewpoint and ask to have things done for the customer.

Commercial men are urged to study continually. There is no end to it. You must know your customer's business; you must know the routing in his factory; you must know his production costs; you must know all about his business as well as all about your own.

A company worth working for is worth investing your money in. Go out and borrow the money if you haven't got it, but invest in it, and you will get a new slant on your job. Make the load factor of that invested dollar return double what it is doing.

Executives do not want commercial men to be "yes" men. They are paying us to bring them ideas to develop business. They want well-thought-out programs.

Two examples show the value of the baking load: In a city of 100,000 population, there is a cooking and baking load of 8,000 kw. That returns a revenue equal to the revenue returned by the lighting load of a neighboring city of only 25,000 population. Two-thirds of that load is off-peak. Much of it was taken on without any substantial increase in the investment. In another city of the same size there is one hotel where the cooking and baking load is equal to 500,000 kw.-hr. a year—the same as the lighting and power consumption.

Are not such loads worth obtaining? Whichever source of heat is best adapted to do this heating and cooking work is the fuel which our men should recommend. If they don't recommend the best fuel from the customer's standpoint, but put in an application which isn't proper, that application will not be permanent and we shall be the ultimate losers.

Merchandising for Consumer Dollars

Trade relations must be good. Must get cost of appliances decreased. Rate schedules unsatisfactory. Adequate wiring must exist

By MARSHALL E. SAMPSELL
Chairman Commercial National Section

Marshall E. Sampsell

WE REALIZE that we are no longer living in the years during and following the war, when we were seriously put to it to provide facilities to serve our fast-increasing loads. Our problem during those trying years was, how can we finance additions to our properties to carry the loads brought to us without solicitation? Our problem now is, how can we most intelligently bring about greater diversification in the distribution of our product—electricity—to safeguard more surely the heavy investments already made, and yet to be made, for generating capacity and distributing facilities?

To protect investments made in transmission lines interconnecting smaller communities and extending into rural districts, where there exists little industrial activity, requires a larger volume of electric service in small-town homes and on the farm. To meet these obligations successfully we must sell more kilowatt-hours through intensive development of new markets that will improve load factor. To bring about and proportionately enjoy intensive development of these new markets is no boy's play. In this undertaking we are forced to meet keen, well-organized competition from other industries equally anxious to grow and prosper.

If our industry is to secure a larger share of the consumer dollar, the executives of our operating companies must bring about closer departmental team work within each company, so that our engineers, accountants and other principal operating officials may look beyond the specific work they perform into the commercial field where co-operative effort is now required.

One of the most serious handicaps to commercial progress is inadequacy and price of wiring, owing largely to code restrictions. The principal reason wiring in general is not adequate is that adequacy has not been sold. Present costs of wiring are perhaps not too high under the conditions of present wiring jobs.

Another serious handicap to our commercial progress is that our rate structures are not sufficiently conducive to broad promotion of electricity. It is not contended these rates are too high, but that their form is not calculated to encourage the most liberal use of energy, which must result in a lower average rate to the consumer. The price of energy is one problem over which our electric light and power companies have most control, and if we can solve that problem, we can better compose commercial problems in which others have a mutual and beneficial interest.

Another handicap to our commercial progress is price of energy utilization equipment and quality standards in types of appliances. Prices may not be too high for the present demand, but are they not too high to permit universal acceptance and use of them by the average housewife who perhaps needs them most? Our section is carefully examining quality standards as affecting costs, performance and market acceptance of both low- and high-priced models.

MISCELLANEOUS ACTIVITIES

A water-heating survey of national importance is under way, the field work being done by the Engineering Section at headquarters. This survey will doubtless clearly indicate that water heating service is of value to the customer and affords wide opportunity for desirable revenue.

Another fact-finding undertaking of consequence to rural customers and our business is the work of the farm appliance sales committee. Its personnel includes representatives from the rural electric service and our merchandise sales committees.

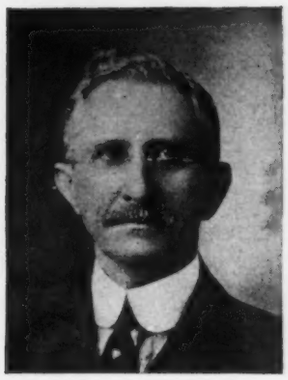
An activity deserving particular support is the plan of our refrigeration committee to point out nationally the relationship of food preservation to health. This plan is non-commercial, includes all groups interested in food preservation, and will be carried to completion by the National Food Preservation Council, of which Matthew S. Sloan is president.

Under the auspices of the Society for Electrical Development, the Commercial Section is taking part in a thoroughgoing search for facts as to adequacy of wiring in typical American homes, number and nature of electrical appliances used in the average household, consumer interest and appreciation of the value of electricity, and

W. T. Blackwell
Chairman Home Lighting Committee

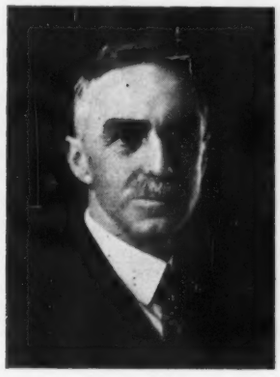
C. L. Harold
Chairman Merchandise Sales Committee

C. L. Dunn
Chairman Refrigeration Committee



N. T. Wilcox
Chairman Water Heating Committee

F. A. Coupal
Chairman Domestic Electric Range Committee

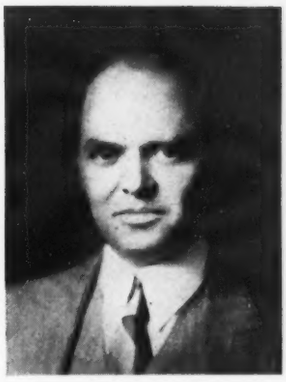


F. D. Pembleton
Chairman Merchandising Bureau

R. J. Malcomson
Chairman Street Lighting Committee

T. O. Kennedy
Chairman Lighting Bureau

E. W. Lloyd
Chairman Promotional Rates Committee



V. M. F. Tallman
Chairman Commercial and Industrial Power and Heating Bureau

A. R. Good
Chairman Wiring Sales Committee

C. J. Eaton
Chairman Electrical Advertising Committee

J. Daniels
Chairman Commercial and Industrial Lighting Committee

ways and means to develop a larger market for electricity in the homes of this country. This survey was made by a leading advertising agency under specific instructions of the sales plan committee of the Electrical Industry Sales Conference.

Our section is co-operating with the accounting section, through a joint committee, in further effort to adjust the accounting problems our enlarged commercial activities have occasioned.

The Commercial Section has been closely studying merchandising methods of others engaged in selling household electrical equipment. Despite our close contact with our domestic customers, we can never satisfactorily develop a maximum volume of appliance sales until we have the complete and cordial support of all other classes of merchandisers of electrical appliances. It is not to our interest, nor have we the slightest desire, to monopolize the appliance business. It is our desire so to plan our sales programs as to encourage and assist the manufacturers and dealers who are helping us promote acceptable labor-saving and convenience services. It is respectfully recommended that the declaration of general merchandising principles agreed to by all concerned and the electrical merchandising standards suggested by the general merchandising committee of our association be followed as guideposts to better trade relations.

Kilowatt-Hour Contest Prize Award

NINE THOUSAND DOLLARS was awarded to six winners in the Commercial Section Kilowatt-Hour Contest at the Wednesday afternoon session of the N.E.L.A. on June 5 at Atlantic City. Three first prizes of $2,000 each were awarded, and three second prizes of $1,000 each.

The contest was participated in by sales departments of class A companies, the prize being for the largest increase in total average annual kilowatt-hour consumption per residence customer, with the objective of attracting attention to the possibilities of increasing domestic use of electricity.

The contest was divided into three classes, based on the total average consumption of each company for the year 1927. Class A was for companies with an average of 451 kw.-hr. or over. The first prize was won by the Cheney (Wash.) Light & Power Company, which developed an average increase from 491 to 686; the second prize by the San Joaquin Light & Power Corporation, Fresno, Calif., for an increase from 625 to 724.

Class B embraced companies with an annual consumption for 1927 from 351 to 450. The first prize was won by the Alabama Power Company, Birmingham, on an increase from 433 to 496; the second prize by the Western Public Service Company, Scotts Bluff, Neb., on an increase from 387 to 449.

Class C was for companies with a 1927 average of 350 kw.-hr. or under. The first prize was won by the Central Power & Light Company, San Antonio, Tex., for an increase from 256 to 415; the second prize by the Western Public Service Company, Beaumont, Tex., with an increase of 264 to 367.

The following honorable mentions were given: Class A, Portland (Ore.) Electric Power Company with an increase of 93; Class B, Durham (N. C.) Public Service Company with an increase of 58, and the Southern Colorado Power Company, Pueblo, with an increase of 54; Class C, Annapolis & Chesapeake Bay Power Company with an increase of 100; Montana-Dakota Power Company, Minneapolis, with an increase of 84.

N.E.L.A. Prize Awards, 1929

Charles A. Coffin Award:

El Paso Electric Company (see pages 1174 and 1175).

H. L. Doherty Gold Medal:

"Investment Merit of the Electric Utility Industry." Everett W. Vilett, Public Service Electric & Gas Company, Newark, N. J.

Harriet Billings Award:

"The Human Side of a Balance Sheet." P. O. Johnson, Northern States Power Company, Minneapolis, Minn.

Martin J. Insull Award:

"A Public Relations Yardstick." Rob Roy MacLeod, Buffalo, Niagara & Eastern Power Corporation, Buffalo, N. Y.

James H. McGraw Awards:

1. "Operating a Hydro-Electric System for Best Economy." E. B. Strowger, Niagara Falls Power Company, Niagara Falls, N. Y.
2. "The Electric Water Heater." H. George D. Nutting, Detroit Edison Company, Detroit, Mich.
3. "Peak Load in Steam Plants and Its Economical Generation." Francis Heisler, Public Service Company of Northern Illinois, Chicago.

J. E. Davidson Awards:

1. "A Study of Merchandise Advertising." Keo Currie and Ray Warren, Public Service Company of Northern Illinois, Chicago.
2. "Specialized Merchandising for the Central Station." Donald D. Parry, Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y.
3. "Winter Humidity and Comfortable Homes." Edwin Fleischmann, Niagara Falls Power Company, Niagara Falls, N. Y.

H. M. Byllesby Awards:

1. "Six Words in an Accountant's Life," by William A. O'Neill, Electric Bond & Share Co., New York, N. Y.
2. "How to Increase the Usefulness of the Accountant in the Public Utility Industry," by F. L. Barry, Electric Bond & Share Co., New York, N. Y.
3. "The Accountant in the Public Utility Industry," by Harold V. Bright, Southeastern Power & Light Co., New York, N. Y.

Frank W. Smith Educational Award:

Raymond H. Young, Public Service Electric & Gas Company, Camden, N. J.

Electricity's Contribution to Commerce

By Dr. Alberto Pirelli
Milan, Italy
President International Chamber of Commerce

BY WAY of introduction, may I extend to you and to the electrical industry throughout the United States, but more particularly to that great American savant and inventor, Thomas A. Edison, my personal congratulations as well as those of the International Chamber of Commerce, on this golden jubilee celebration.

Mr. Edison happens to have been born in the United states, but he belongs to the world. It would be idle for me to dwell on his many and beneficent inventions. Labor has been incessant with him, and his life is a song of hope to the youth of all lands. For after all, none of us lives unto himself. Centuries ago a great poet of my own country expressed it thus: *Sic vos non vobis mellificate apes.* That is to say, "Not for yourselves; but for others do you produce honey, bees."

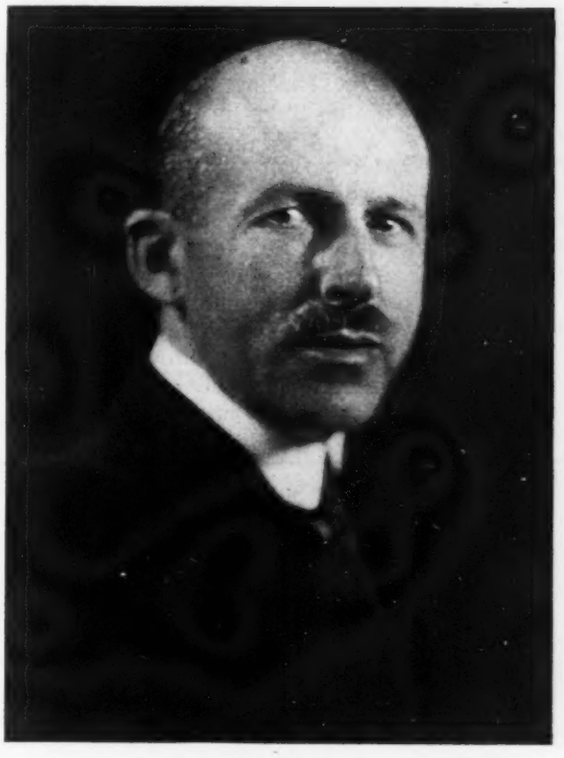
As president of the International Chamber of Commerce, I am happy to voice the admiration of the business men of 46 nations for the work of the inventor and for the development of scientific research. And in no place is this work more manifest than in the United States.

Your country is magnificent in its ideals, its citizenry, its power, its wealth and its possibilities. America is indeed "a land flowing with milk and honey," and it possesses, besides, a very real and extraordinary vitality, giving to its work a freshness and force which astonish and at the same time command the admiration of the world.

It is a pleasure also for me to note the growing spirit of brotherhood shown by Americans generally toward other and older civilizations, especially in international and inter-racial relationships. The tendency is no longer to employ the American standard as a measure with which to judge others, but to study a country, its background, its people, its traditions and its psychology and thus to find a way to live in a world of individuals with varying standards, varying ideas and ideals, varying strengths and weaknesses, and to understand them sympathetically. It is in this understanding of others, this getting into their lives and appreciating them, that the great hope for international conciliation lies.

But my purpose at this time is to bear tribute to the splendid record made by your industry and to the dominating position of the United States in matters electrical. No one knowing anything about the electric light and power industry can picture it as being static in any country, and least of all in the United States. Public appreciation of electricity arrived long before its economic victories. It was accepted that it would do the things people expected of it and it always exceeded expectations.

One great asset of electricity is that it has enabled countries like Italy, Switzerland, Norway, Sweden and others possessing little or no coal to develop their water powers for civic, domestic and industrial use and has also made possible the conservation of other natural resources to the great advantage of civilization. It has brought untold benefits to industry and commerce and has provided comforts and leisure for the home so that great multitudes enjoy a freedom and a dignity beyond that which earlier civilizations allowed. And for much of this the world is indebted to the inventive genius of Edison.



Dr. Alberto Pirelli

Years ago Beethoven was conducting a performance of his Ninth Symphony. So moved and entranced with the beauty and majesty of the music did the audience become that they stood and applauded the composer enthusiastically. But Beethoven heard not, heeded not, for his ears were deaf to their cheers. For years Edison also has lived in that silence which Ibsen calls "the home of the strong," and my hope and heart's desire is that if he cannot hear, he may at least sense how great is the gratitude of a world which this day salutes and cheers him as one of its worthiest inhabitants.

Incandescent Lamp a Blessing

By Sir Kengo Mori
Tokio, Japan
Chairman Japanese Committee of Experts on Reparations

THE event we are celebrating today is not something which can be celebrated one day and forgotten the next; you will remember it every day and forever. An invention whose advantages can be enjoyed by only one section of the community or the people of one country cannot be termed a true blessing, but the electric lamp is a true blessing in the sense that its beneficence extends to every man and woman the world over.

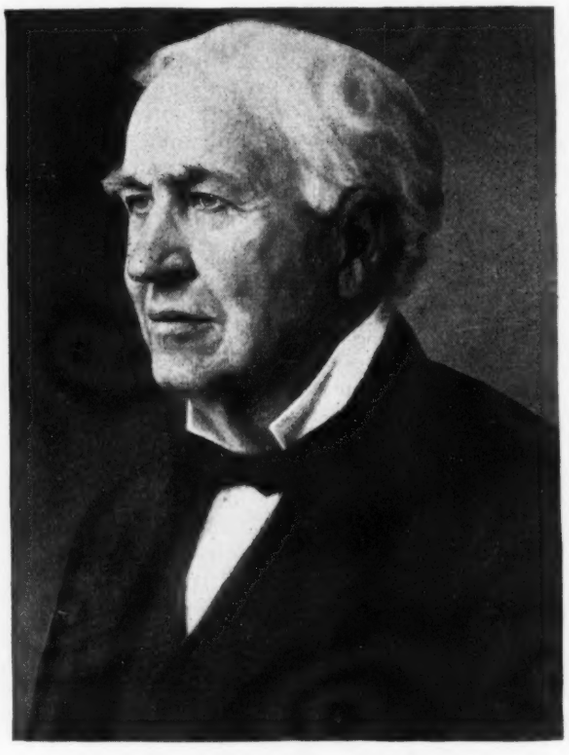
I am one of those who were not so blessed in their youth; my studies were made under the oil lamp. I like to think that that time is not very long back, and it is certainly a very short time for the electric lamp to have made such remarkable progress considering that, according to the statistics I have, my country was lighted at the rate of one lamp for every two people in 1927; no later figures are available, which fact throws into a relief as clear as the illumination I am talking about the rapidity of the expansion this public utility is making.

The electric lamp has a sister, equally admired, more vocal, but less enlightened. I refer to the telephone. This lady, however, is less fortunate and is often seduced in government hands; her virtue is not therefore always irreproachable.

There are three virtues which are rarely possessed combined by mortals: Beauty, a cool head and a warm heart. The only thing I know which possesses them is a mountain in Japan. Its name, which must surely be known almost as universally, is Fujiyama. It is beautiful in form; its head is cool in perpetual snows and its heart is warm with internal fires. But it has its peer in the electric lamp, which is a happy mixture of these three virtues.

Let us hope that this wonderful creation may make still further progress in the days that are to come and in its gathering strength bring light upon the questions which trouble mankind and in the solution of which the west and the east must join hands.

Edison Movietone
Gives Message to Nelaites



"WHEN I invented the incandescent lamp, I realized that the lamp alone was not enough. It was necessary also to perfect a system of electric generation and distribution. I immediately set about to develop it, and it makes me happy to know that the system as well as the lamp still persists in all its essentials.

"I had in those days a high opinion of my invention. All inventors have. But I must confess that I never dreamed that from it would come the stupendous electrical industry of today.

"Naturally I am gratified to feel that I have been privileged to play a part in this vast achievement. I am proud of the electrical industry—of its vision, courage, zeal and devotion to public service, and I suspect every American feels the same way about it.

"It is a great reward to me and the many colleagues and co-workers, who I rejoice to say are still living, that we have survived to see the full fruit of our labors. The record is wonderful, but, fine as it is, it can be made still better, and I have a feeling that in your hands it will be."

Sir Ernest Benn

The Superiority of Private Enterprise

By Sir Ernest Benn
London, England

THE property problem—the question as to whether wealth or property should belong to the individual or to the community—has been discussed and debated ever since the days when public affairs first became the subject of thought and conversation. Plato advocated the public ownership of property and for twenty centuries people who were not so well off as they would like to be have argued that there was something wrong with private ownership.

The argument still goes on today, and yet the vast

Introductory Movietone Remarks

OF

W. H. Onken, Jr.
Senior Editor Electrical World

THIS year marks the 50th anniversary of the invention of the electric incandescent lamp by Mr. Edison, and inasmuch as the lamp was but the forerunner of a system of electric generation of distribution at low tension, also invented by Mr. Edison, it is but natural that the electric light and power industry should celebrate the event.

Now a prophet is not without honor save in his own country, and Preston Arkwright, president of the National Electric Light Association, conceived the idea that some foreigners of note might be induced to pay tribute to the beneficent work of Mr. Edison for humanity and to tell of what electricity has done for civilization.

The question, then, was whom to invite and how to secure them. It would have been pleasant and entertaining to have some outstanding foreigners appear in person on the platform, but that was too much to expect. To have them express their sentiments in writing would be to rob their thoughts somewhat of their personal charm and magnetism.

Then the idea of a talking movie suggested itself. Here was something electrical which might measure up to the occasion. A moving picture surcharged with action and personality, and animated by a living, human voice.

The idea, to be sure, was novel and dramatic. The movietone has never been used before for such a purpose and it is only natural that a progressive and enterprising organization like the National Electric Light Association should be the first to employ it for this Golden Jubilee Celebration.

Through the courtesy of Mr. McGraw I was loaned to the National Electric Light Association and sent to Europe to obtain speakers and movietone records. This in countries slow of pace and slower of action was not an easy task. But I was fortunate in getting in touch with people possessing a vaster vision of the world and to whom the youth, confidence, enthusiasm and vigor of the United States were not unknown. These men graciously consented to make movietone records for the occasion. They include Sir Kengo Mori, head of the Japanese Debt Commission, Dr. Alberto Pirelli of Milan, Italy, president of the International Chamber of Commerce, and Sir Ernest Benn, well-known economist and publisher of London.

In addition we were very fortunate in obtaining a movietone record of Mr. Edison himself. One of these movietones will be shown at each of the morning sessions during the week of the convention.

bulk of all the property in the world is still in private hands. We are asked to believe that the whole world has been wrong through all the ages and that there is a better way—the way of public ownership. It wants some courage, in face of the accumulated experience of mankind, to carry on this old argument, but socialists and revolutionaries make up in courage what they lack in brains.

When property consisted almost entirely of land and cattle and natural products there was a suspicion of a case for public ownership, but today, when property and wealth are 95 per cent brains and 5 per cent nature, public ownership is the road to the end of our civilization.

Before wealth or property can be owned it has to be made, and nobody will suggest that society can make anything. The making of wealth is beyond any question the exclusive function of the individual. The best society or community or state, from the economic point of view, is the one which has among it the greatest amount of wealth. The best public policy, therefore, is that which will encourage the making of the maximum of wealth.

If, for instance, six people can live in comfort in one house, a community of 60,000,000 people will require 10,000,000 houses. If only 8,000,000 houses exist, a discussion as to their ownership is apt to obscure the real problem—how to get another 2,000,000 houses built.

Public authority can own, but it cannot make. It only owns what it can extract by force from the individual who does the making. Public ownership, therefore, acts as a discouragement to those invaluable citizens who are by nature makers of weatlh, and encourages the incompetents, the parasites, the incapables and the pauper-minded.

Wealth Must Be Preserved

I have said that before you can own wealth or property, it must be made, but there is a third consideration —it must be cared for, preserved, maintained and guarded from depreciation. A public authority which has confiscated—for all taxation is confiscation—which has confiscated wealth, values it so lightly and cares so little for it that it will throw it away on the slightest provocation. The world is littered with the ruins of public works that have been discarded.

The civilization of each generation through the whole of history has rested upon the private property made, owned and cared for by the previous generation. There is no exception to this universal and age-long experience. On the other hand, each generation has been handicapped with the debts of its forefathers represented only by the blunders of public ownership.

The private individual tends always to acquire wealth—real wealth—which remains in the community for its comfort. No community has ever acquired anything worth mentioning but debts—the opposite of wealth. Marshall in the *Principles of Economics* says:

> The tendency of careful economic study is to base the rights of private property not on any abstract principle, but on the observation that in the past they have been inseparable from solid progress; and that therefore it is the part of responsible men to proceed cautiously and tentatively in abrogating or modifying even such rights as may seem to be inappropriate to the ideal conditions of social life.

The property in the hands of the public authorities of the world today is not worth more than 5 per cent of the amount of the debts of the same authorities. That, after all, is quite natural, when we remember that it is nobody's business to look after public property.

The argument, therefore, boils down to this. The economically perfect society wants the maximum of wealth—houses, railways, electricity plants, steamships, machines and a number of other things. All experience shows that the private individual, through private ownership, is the only agent that can be trusted with these things. He makes them, he cares for them, and he passes them on, free of debt, to the next generation.

Can there, then, be a shred of doubt in the mind of any reasonable man that the public good, the well being of society, the advancement of civilization, the raising of the standard of life of the people and all the highest and the best of economic aims can only be secured by a firm adherence to the principle of private ownership?

The Early Days of N.E.L.A.

By Elmer A. Sperry

President American Society of Mechanical Engineers

THE original committee of call for the National Electric Light Association was the result of a number of meetings held at the Grand Pacific Hotel, Chicago, in the late winter of 1884-1885 by peeople interested in electric arc illumination in Chicago and near-by cities, whose business was being seriously interfered with by the complaints of the embryo telephone exchanges in the same townss, which were just beginning to take on importance and which were all running with grounded lines.

The committee as named were Sperry, chairman, Terry and Bowen. The second name is none other than the late lamented F. S. Terry, then a young man of my own age. He had always been an outstanding character, a man of great energy and foresight in the electric light industry and founder of Nela Park in Cleveland, the principal home of incandescent lamp pregressive research. At that time Mr. Terry operated the largest electrical supply business in the United States, located in Chichago with branches in various other centers.

The third member of the committee, Mr. Bowen, was a tall, genial gentleman in middle life, who was trying to make bothe ends meet by the operation of a Vanderpool electric light system in the near-by city of Elgin, Ill. He was also connected with the printing business. A circular inviting the original conference of electric light station owners to assemble in Chicago in February, 1885, was drawn up by Mr. Terry and myself in my rooms in Chicago nd forwarded to Mr. Bowen, who had promised to print and mail the circular gratis if we would compile it. The response was beyond our most sanguine expectations. As I remember, there were about 140 people from practically all the main centers of the United States east of Kansas City, and that two or three-day meeting eventuated as the first session of this great body of the National Electric Light Association.

The object of the meeting was to see if ways and means could not be devised to prevent or in some measure alleviate the very aggravating situation created by the induction from the electric light wires as soon as the plant was started up, making telephonic communication very difficult.

Practical Aspects of

Standardization

Results of work done measured in economic terms. Outline of standards already made. Suggestions for future work

By L. L. ELDEN

Edison Electric Illuminating Company of Boston

WE FIND in the telephone industry the most highly standardized undertaking in the electric utility field anywhere in the world. This status has been reached only by successive steps as the result of intensive research and experimentation by a highly trained organization, without which the present-day perfection of communication facilities could never have been attained.

Lack of standards during the first thirty years of the electric light industry was undoubtedly responsible for serious losses in many directions. This situation was but the natural outcome of independent development of systems and apparatus in a new industry. The combination of numerous frequencies and voltages, direct and alternating currents, series and multiple systems and overhead underground distribution methods were handicaps which would have destroyed almost any other new industry. In this case the world-wide desire for better illumination provided the necessary incentive to continue development work in the hope of ultimate reward.

Most of these troubles are now behind us. The adoption of 60 cycles as a national standard, supplemented by 25 cycles for special applications, solved the frequency question and paved the way for the development of systems and standardized equipment on a scale even now unapproached elsewhere in the world. Concentration upon a minimum number of types of systems for generation, transmission and distribution and the elemination of the many odd and special voltages utilized in early practice have been contributing factors to present success.

With these fundamental factors established, progressive standardization has followed in other branches of the business, all designed to secure maximum operating efficiency. For steam plants the designs and construction of boilers, piping, fittings and associated equipment have been reduced to definite standards through the creation of standard specifications. The designs of generators, converting and switching apparatus and overhead and underground construction have also been more or less standardized at intervals in recent years, although such standards have been subject to frequent changes to keep pace with a rapidly changing industry.

Insistence on special designs and failure to adhere to the use of existing standard apparatus have materially retarded efforts toward standardization in many directions. In view of such success as has been attained in recent years, it may be of interest to comment upon some outstanding examples of standardization which have been of major interest to utility interests and their customers.

The present-day incandescent lamp is perhaps one of the best-known examples of accomplishment through standardization. Progress in this work from the days of the carbon lamp has been reflected, in so far as public interest is concerned, in a steady improvement in efficiency accompanied by heavy reductions in selling prices.

Efficiencies of 0.5 watt to 1 watt for modern lamps may be compared with 5 watts and 6 watts or more per candle for early carbon lamps. Selling prices have been reduced 53 per cent since 1914 and 50 per cent since 1920. Two 40-watt lamps may now be purchased for the price of one in 1920. Standardization of lamp voltages within a range of 100 to 130 volts in 1914 reduced the number in common use from twenty to five. Similar action in 1924 further reduced this number to three. Concentration of demand on a few types and sizes, the extensive use of automatic machinery and the introduction of mass-production methods have in this instance, as in many other lines of business, effected large reductions in the cost of the manufactured product.

Recording Wattmeters, Transformers, Motors

Twenty-five years of intensive effort in the development of recording wattmeters have produced the present simplified and standardized product. In the face of enormous development costs, the average selling price of alternating-current meters has been reduced from $11 to $9. On an annual production of 1,500,000 meters the saving to purchasers of this single commodity reaches $3,000,000.

Voltage standardization has been an important factor in transformer development through making possible substantial reductions in the number of sizes and types of transformers regularly manufactured. Through the joint action of the N.E.L.A. and N.E.M.A. interests in 1924 in agreeing upon a schedule of standard voltages, a reduction of 50 per cent in the number and sizes of ratings was effected. For this greatly improved product selling prices have been steadily reduced to about 42 per cent of 1896 prices and are now only about 7 per cent higher than 1914 costs in the face of higher general costs now prevailing.

Motor standardization has long been required for economic reasons. Recent progress in this direction has fully justified the extended efforts which were required to secure general agreement upon satisfactory performance characteristics and rating methods controlling the

design of the great bulk of motor production. Settlement of the long-standing controversy between advocates of a 40-deg. and advocates of a 50-deg. basis of rating, by the adoption of a single standard of 40 deg. plus a service factor as the future basis of motor rating, paved the way for general standardization.

Selling prices of motors now reflect in part the results of this work. For example, three 1-hp. general-purpose motors cost slightly less than one similar motor in 1902. Another example is the well-known quarter-horsepower washing-machine motor, costing $25 in 1921, which now sells for $9.50.

Under pressure of utility engineers, previously existing standards have been modified to provide supplementary ratings for apparatus under "service conditions." Recognition of this principle as already applied to general-purpose motors and transformers permits an increase in the rating of these specific classes of apparatus ranging from 15 per cent upwards under prescribed temperature conditions. The inclusion of "service ratings" in all rating standards based upon limiting temperatures should engage the attention of all standard-making interests, pending the time when rating standards based upon maximum temperatures may be properly substituted for prevailing methods.

Concentrated efforts have finally resulted in an agreement upon a new basis for voltage standardization which recognizes for the first time in the history of the industry the various steps in regulation from power house to the customer which are necessarily encountered in actual practice. These standards as now constructed are primarily based upon delivered voltages and, therefore, include specifications for primary and secondary transmission and distribution voltages with the necessary tap connections required under standard operating procedure. Under this program we may anticipate rapid concentration upon the use of not more than two lamp voltages.

International standardization of voltages appears impossible at the moment, largely owing to long-standing differences in national practices which now preclude wholesale changes in construction and operating procedure to secure international agreement on this question.

What Is Expected of Engineers?

By F. R. PHILLIPS
President Duquesne Light Company

WHAT is the ultimate of engineering achievement? Is it simply to design or to build something? Is the ultimate of a boiler in a power station to generate steam, the steam to turn a turbo-generator, and the generator just a device to deliver the energy through the transmission and distribution system to the premises of the consumer? While the goal of engineering is still better engineering, greater economy and greater facilities, still these are minor to one great purpose, that of contributing to human progress so that poverty and drudgery may be banished.

With the various projects becoming larger and more powerful it would seem that the engineer has a right to expect to be called upon to operate and manage such larger undertakings. In many cases he is called upon to do so. Accordingly, the accomplished engineer must not only be a designer, or builder, but must understand human nature, particularly those associated with him in his responsibilities. He must be an economist of no small order. It may seem strange, and may not be generally appreciated, but nevertheless is a fact, that the larger a business the more sensitive it is to the inexorable laws of economics. There it is that the competition is the keenest and there it is that the major mistakes are most deadly.

With the increasing technical activities of our country, the realms to which a gifted engineer may rise seem unlimited. But the engineer who would rank as an engineer of high type must be obsessed by the conviction that whatever he does, whether in a low or a high position, is contributing to the well being of mankind. If he is not so minded, I am afraid there will be no satisfying joy in his work for him.

The type of engineer for whom there will always be a crying need must be more than a technician and must be able to do more than design and construct. He must be a manager, well versed in economics, finance and public affairs, possessing a sympathetic understanding, a leader, dominated by a desire to promote the public welfare in order to bring successful results not only out of his own vision, but out of the vision of others so that the dreams and aspirations of mankind may come true.

F. R. Phillips

Therefore, the keynote of our present era is the coordination of human effort for the good of all, in which the engineer may play a commanding part.

News of the Industry

Los Angeles Beats City Bond Issues

Power and Water Plans, Involving $40,000,000, *Fail to Get a Two-thirds Vote, the Power Issue Having Bare Majority*

VOTERS of Los Angeles defeated both the water bond and power bond issues at the election on Tuesday, June 4. A two-thirds majority was required for the passage of each issue. The vote on the water bond issue of $22,500,000 was: Yes, 147,335; No, 86,981. The vote on the power bond issue of $17,500,000 was: Yes, 110,149; No, 109,510.

Senator Norris Reintroduces His Muscle Shoals Bill

Senator Norris' resolution for the creation of a government corporation for the control of the Muscle Shoals properties was approved on May 29 by the Senate committee on agriculture and forestry and favorably reported. It is almost identical with the measure which was passed by both houses in the last Congress and killed by the pocket veto of President Coolidge, now sustained by the Supreme Court.

Says the committee: "In the face of the terrible disclosures made by the Federal Trade Commission the power trust is still active. It demands that the natural resources of the country shall be turned over to private corporations for private profit. It insists on capitalizing for its own profit the property of the people."

One new section has been added to the bill by Senator Norris to provide payments to Alabama and Tennessee in lieu of the taxation returns which these states would receive were the properties developed by private interests, as follows:

"Five per centum of the gross proceeds received by the board [directing the corporation] for the sale of power generated at Dam No. 2, or from the steam plant located in that vicinity, or from any other steam plant constructed in the State of Alabama, shall be paid to the State of Alabama; and 5 per centum of the gross proceeds from the sale of power generated at Cove Creek Dam, hereinafter provided for, shall be paid to the State of Tennessee. Upon the completion of Cove Creek Dam the board shall ascertain how much excess power is thereby generated at Dam No. 2, and from the gross proceeds of the sale of such excess power 2½ per centum shall be paid to the State of Alabama and 2½ per centum to the State of Tennessee." This does not apply to power used for government purposes.

Mr. Norris pointed out that Congress has deliberated for eleven years without bringing the Muscle Shoals property, which cost the government upward of $120,000,000, into economic use. He said that the resolution provides a far-reaching program for the development of power, flood control, navigation and fertilizer research. The proposed Cove Creek Dam, he said, will create the largest reservoir in the East and will double the power output at Dam No. 2, becoming an important factor in flood control on the Tennessee and Mississippi Rivers. If this reservoir were privately operated, he declared, the attempt would be to keep it as full as possible for power-storage purposes, thus leaving little excess capacity for flood control.

In the committee discussions it was pointed out that with power becoming less important in nitrogen fixation a power surplus is left at Muscle Shoals which must be used for purposes other than fertilizer production.

Passage of the resolution would set up a corporation having three directors appointed by the President of the United States. The directors would appoint a manager and two assistant managers.

O. C. Merrill to Resign from Power Board

Executive Secretary, Who Has Held That Office Since Organization of Federal Commission, Will Be Succeeded by F. E. Bonner of California

OSCAR C. MERRILL, who has served with the Federal Power Commission as its executive secretary since the organization of that body in 1920, is about to resign to accept the permanent chairmanship of the American section of the World Power Conference, in the interest of which he will establish offices in both Washington and New York and to which he will devote all his time.

O. C. Merrill

Mr. Merrill has been the permanent pivot around which the work of the Federal Power Commission has revolved, the membership of that body having, of course, changed every time that one of the three Cabinet portfolios whose holders make up the commission has passed to a new Secretary of War, Agriculture or the Interior. Thus with the advent of the new government last March all three of the members were men hitherto unconnected with the commission. This method of constituting the board has rendered the post of executive secretary one of especially great importance, and Mr. Merrill has filled it with unusual ability, knowledge and zeal.

The Federal Power Commission will, with the approval of President Hoover, appoint as Mr. Merrill's successor Frank E. Bonner of San Francisco, who since 1922 has been a district engineer with the Forest Service. He has been engaged very largely in work for the Federal Power Commission in the investigation and administration of water-power development in California.

Offices for the American section of the World Power Conference have been engaged in Washington at the Edmonds Building, 917 Fifteenth Street, N.W. The New York offices will not be opened until after Mr. Merrill's return from the meeting of the World Engineering Congress in Tokyo. Mr. Merrill will be assisted by Pierre Grosheintz, a Swiss engineer who has been associated with the World Power Conference for a number of years, and by Miss Marguerite Waters, who has been engaged in hydro-electric work in both the Forest Service and the Federal Power Commission.

It is anticipated that the sections of the conference in other countries also will set up permanent offices, as it is a part of the program of the conference to have each of the nations take a more effective part in the international meetings. One of the reasons for establishing a sectional office in Washington at this time is to look after the arrange-

ment for the forthcoming meeting in Tokyo in October and the second plenary session of the conference, which will be held in Berlin in 1930. As it is expected that the third plenary session will be held in the United States in 1934, the governing board of the American section is particularly anxious that adequate preparation be made for what is expected to be the most comprehensive and important session of the conference. If Chicago's plan to stage a world fair in that year is carried out, it is probable that the World Power Conference will be held in that city.

Mr. Merrill has been at the head of the American section since the creation of the original committee in 1923. Hugh L. Cooper has been made a member of the governing board of the American section.

Second Unit Is Installed in Big Creek Plant No. 8

Completing the present series of hydro-electric plants on its Big Creek-San Joaquin development project, the Southern California Edison Company on June 1 placed in operation a 40,000-hp. generating unit in its plant No. 8 at the junction of Big Creek and the San Joaquin River. This is the second unit in plant No. 8, the first, rated at 32,200 hp., having been installed in 1921. This second unit was placed in plant No. 8 in order to utilize the additional water made available through the development of the Shaver Lake 138,000 acre-ft. reservoir and the Big Creek 2-A plant. Both plants 2 and 2-A discharge into the same afterbay, which in turn becomes the forebay of plant No. 8.

Canadian Parliament Kills Energy Export Act

The Canadian Senate has killed the bill to amend the electricity and fluid exportation act so as to make it necessary for Parliament to approve all contracts for the exportation of electrical energy to the United States. This authority will therefore continue to be vested in the Governor-in-Council.

By the final adoption of a bill in the Canadian House of Commons on May 28 the water powers in the Provinces of Manitoba, Saskatchewan and Alberta have been turned over to those provinces. The act was designed to meet the requirements of a resolution which, as already reported, passed the House of Commons earlier in the session. The basis of the transfer is that the water powers in the three prairie provinces shall be administered in the same manner as that provided for by the British Columbia water-powers act of 1911. As the Dominion government retains control of all park areas in the three provinces, it has been intimated that Alberta's park boundaries probably will be changed next year to make the Spray Lakes power facilities available to the province.

Federal Board on Interstate Power Sought

Senator Couzens Amends His Communications Commission Bill to Provide for Adjudication of Electrical Rates Complained of by State Authorities

SENATOR COUZENS of Michigan on Monday introduced an amendment to his Communications Commission bill that would give that proposed agency jurisdiction over the interstate transmission of electric power. Under this amendment he proposes to alter the name of the commission to: "Commission on Communications and Power."

In that portion of the amendment devoted to definition of terms "power" is declared to be "electrical energy produced through the utilization of any natural resource" and to include such electrical energy "whether transmitted by wire or wireless and whether or not produced by a licensee under the federal water-power act."

The amendment provides that upon complaint to it by a state commission concerning the rates charged for power transmitted in interstate commerce the new commission shall refer the petition to a federal agency to be known as a joint board, composed of one representative of each state in which the power is produced or consumed. In the case of a state having no commission a petition may be filed by the governor. The representative of the state upon any joint board shall be selected in such manner as the state may by law provide, except that, if the state has no provision of law for such selection, the representative of the state may be appointed by the state commission for that state, or if there be no state commission, then by the governor of the state.

Each determination by a joint board shall be filed by the board with the commission and shall become the determination of the commission within 30 days after such filing, unless within such period exceptions to the determination of the joint board are filed with the commission by any party to the procedure. If such exceptions are filed with the commission, it shall take appellate jurisdiction of the proceedings. The joint board or commission shall ascertain whether the rate covered by any petition is unjust or unreasonable, or whether the public convenience and necessity permit of the abandonment of the service covered by any petition. If such rate be found unjust or unreasonable, the joint board or commission shall determine the just and reasonable rate. If the public convenience and necessity is found to permit of the abandonment of the service, the joint board or commission shall issue a certificate for the abandonment thereof, which otherwise will not be permitted. Any determination of the commission under this section shall be final, except that proceedings to enforce, suspend or set aside in whole or in part any such determination may be instituted in the Court of Appeals of the District of Columbia.

The Couzens resolution authorizing the Senate interstate commerce committee to hold hearings to investigate the interstate transmission of telephone, telegraph and radio communications and to subpœna witnesses was reported favorably to the Senate on June 4. The resolution now goes to the Senate finance committee for consideration. Under the terms of the resolution, the interstate commerce committee's hearings are to cover three general phases in the investigation. The first phase concerns the relationship existing between the different kinds of communication service, the second relates to the ownership and control of persons and corporations engaged in carrying on interstate and foreign communication services, while the third division refers to the other connections and relationships that may exist between the communication services.

Lackawanna to Buy Power

Plan to Build Own Generating Plant Abandoned and New Jersey Central Stations Will Supply Energy—Work Soon to Start

THE Lackawanna Railroad has abandoned its contemplated plan to build a power plant and generate power for the operation of its suburban trains and, instead, will purchase the required electrical energy from the public service companies serving the territory.

"After mature deliberation of this problem, pro and con, the management decided that the Lackawanna could serve its patrons to better advantage by devoting its undivided attention to the matter of conducting transportation, instead of branching out into the power-manufacturing business. Accordingly, contracts covering the furnishing of the necessary power for a period of twenty years have been made with the Public Service Electric & Gas Company, the Jersey Central Power & Light Company and the New Jersey Power & Light Company, respectively," said President Davis on Wednesday.

The lines which the board of managers have authorized to be electrified at this time, work to start soon, include the Morris & Essex Division from Hoboken to Dover, the Passaic & Delaware from Summit to Gladstone and the Montclair branch—a total of 78 miles of road and 173 miles of track.

The 3,000-volt direct-current system of electrification with overhead contact wires has been chosen for this service because it seems best suited for both suburban and long-distance main-line operation. In the event that later on it is deemed advisable to carry the electrification of the line over the Pocono Mountains to Scranton and the anthracite coal fields, this system can be extended without having to be rebuilt.

Institute of Applied Light Opens Its Doors

Westinghouse Lamp Company Inaugurates Its Laboratory of Illumination with a Banquet to and Inspection by Three Hundred Invited Guests

VISITORS to the number of nearly three hundred attended, by invitation, the official opening of the Westinghouse Lighting Institute, Grand Central Palace, New York, on the evening of Thursday, May 30. They included many leaders in the light and power industry on their way to the Atlantic City convention of the National Electric Light Association. Prior to the official opening the party were guests of the Westinghouse Lamp Company at a banquet held at the Roosevelt Hotel. The story of the institute itself, which occupies the entire seventh floor of the building and is designed as a complete laboratory in applied lighting, was told with illustrations last week on page 1101.

While the dinner primarily marked the completion of the institute, it served also as an occasion for the visitors to greet A. W. Robertson, who was recently elected chairman of the Westinghouse board of directors.

Walter Cary, president of the Westinghouse Lamp Company, presided as toastmaster, and a few very brief speeches were made. After presenting the institute to the electrical industry Mr. Cary called on Mr. Robertson, who greeted the company's visitors and expressed the hope that this great effort on the part of the lamp company would fill a need by bringing still greater appreciation of the use and possibilities of artificial light. P. S. Arkwright, president of the National Electric Light Association, and H. P. Liversidge, president of the Association of Edison Illuminating Companies, responded, expressing the industry's appreciation of the gift made to it.

M. S. Sloan, president of the consolidated electric utilities in New York City, also expressed his high regard for the Westinghouse company's initiative in conceiving the institute and his satisfaction that it should have been located in the heart of the territory that his companies serve. He pledged himself to see that important lighting specialists in the field, architects and contractor-dealers alike, visit and study the displays at the institute, and he suggested that every manager of a light and power company throughtout the country do likewise.

A vivid appreciation of the size of the institute was afforded by the readiness with which it absorbed the guests after the banquet. Small groups strolled around for several hours viewing the many rooms without there being a semblance of crowding in any of them. All of the displays and equipment were in working order.

As a part of the working program of this permanent institution, announcement is made in a booklet just issued that the first annual illumination conference will be held June 24, 25 and 26. The conference is primarily arranged for experienced illuminating engineers who are actively engaged in lighting practice and also those interested in spectacular and decorative lighting. The entire three-day program is outlined in the booklet. For three days, September 19 to 21, inclusive, a course in general and fundamental principles of applied lighting will be arranged for beginners and students of the art of illumination. Later a course for women in home lighting will be given.

All of these courses are free, and those planning to attend are requested to notify Director Ralph Neumuller, whose headquarters are at the institute. On and after June 1 the institute will be open for visitors from 10 a.m. until 5 p.m. daily except Sunday, and for special parties visits during the evening can be arranged in advance.

Coming Testimony for Federal Trade Commission

Further testimony concerning the financing of the Mobile (Ala.) *Press* will be heard on Friday, June 14, by the Federal Trade Commission, when Victor M. Hansen, editor and publisher of the Birmingham *News*, and Joseph F. McGowin of Mobile are scheduled to appear. The latter, it will be recalled, lent $100,000 toward establishing the new paper, which sum was suspected of having come from utility sources. Mr. Hansen was instrumental in placing R. B. Chandler as editor of the *Press*. Mr. Chandler also will appear.

Colonel Ira C. Copley, owner of newspapers in Illinois and California, is still scheduled for Thursday, June 13, on which date one or two other witnesses are likely to be called.

Electrical Wholesalers at Hot Springs

Independent Jobbers Resume Ascendancy in Association Affairs—Optimism Is Tempered by Note of Caution—Triple Functional Division to Be Tried

CONFIDENCE in the future of the electrical jobber and satisfaction with the high level of prosperity which the electrical distributors are this year generally enjoying were manifest on every side during the convention of the National Electrical Wholesalers' Association, held at Hot Springs, Va., May 27 to 31. Once again, it was remarked, the independent jobber is apparently in the ascendancy in association affairs as well as in volume of total electrical business done throughout the country.

In his opening address Chairman G. E. Cullinan referred optimistically to the increase noted in general business but spoke also of factors which may affect the electrical trade situation unless watched carefully. Manufacturers sometimes overestimate the available business and must recognize that they are dealing with new economics in their competition for the customer's dollar. Mr. Cullinan urged jobbers to study carefully their costs of doing business, especially in cities where competition is keen.

Intense interest was shown by the jobbers in an analysis of a typical electrical wholesale business presented by J. W. Millard, specialist of the Department of Commerce. This complete report will not be available for several weeks, but in his advance discussion Mr. Millard revealed that 50 per cent of this particular jobber's orders were for less than $10 each and that his volume was made up 37 per cent from contractor-dealers, 26 per cent from contractors, 18 per cent from industrials and 19 per cent of miscellaneous pick-up business.

"Radio Today and Tomorrow" was interestingly discussed by Dr. A. N. Goldsmith, vice-president Radio Corporation of America. Within ten years, Dr. Goldsmith predicted, we shall have talking television apparatus in the homes of America, supplemented by film "talkies," film phonographs and recording sound and vision receivers—all parts of or grouped around a vast electrical amusement industry supplementing or supplanting present theaters and picture houses.

Frank A. Ketcham, president Graybar Electric Company, spoke on "Compensations," and George C. Osborne, general sales manager Edison Lamp Works, told of the plans for "Light's Golden Jubilee" this fall.

At Friday's executive session E. M. Keatley reported on the recent national wholesale conference at Washington. There was also discussion of a proposal by Martin Wolfe, Chicago, to divide the operations of each of the twelve commodity committees of the association into three functional departments: (1) trade relations, (2) market survey, and (3) better selling, with a vice-chairman heading each division. A steering committee was instructed to apply this plan of functional division first to one or two of the commodity committees in order to observe the operation of the plan before instituting it generally among all the committees. The need of an additional commodity committee to study motor-driven industrial devices was also stressed, since these devices are an increasing factor in the electrical wholesalers' business.

George E. Cullinan of the Graybar Electric Company was re-elected chairman of the general executive committee, and E. M. Keatley, Virginian Electrical Company, Charleston, W. Va., was re-elected vice-president. C. J. Litscher, Grand Rapids, Mich., was elected chairman of the Central Division and E. M. Keatley chairman of the Atlantic Division. The fall meeting of the association will be held at Cleveland in November.

Purchases and Mergers

Erie County Electric Goes to U.G.I.—North American Subsidiaries in St. Louis Territory to Merge—Concord, Mass., Won't Sell to Boston Edison

PURCHASE of a majority of the capital stock of the Erie County (Pa.) Electric Company by the United Gas Improvement Company is announced by John E. Zimmermann, president of the U.G.I. Since March 1, 1928, the U.G.I. has supervised the operations of the Erie company.

The Union Electric Light & Power Company of St. Louis has applied to the Missouri Public Service Commission for authority to buy from the North American Company at $100 per share all of the common stock of the Mississippi River Power Company and the common stock of the Central Mississippi Valley Electric Properties. All are under the same control.

Merger of the Connecticut Electric Service Company and the Connecticut Electrical Securities Company of Hartford, Inc., has been approved at special meetings of stockholders of the two companies. The Connecticut Electric Service is controlled by the Connecticut Electric Syndicate, which owns 515,000 of the issued shares and which in turn is controlled by the United Gas Improvement Company of Philadelphia. The Connecticut Electrical Securities was formed early this year to consolidate various holdings of the Connecticut Electric Service.

Concord, Mass., has voted not to sell its municipally owned lighting plant to the Edison Electric Illuminating Company of Boston for $600,000, as proposed. The vote showed a majority in favor of the sale of 312, but this was 82 short of the two-thirds vote needed to carry.

The Rochester (N. Y.) Gas & Electric Corporation has filed a certificate in the office of the Secretary of State merging the Bolivar-Richburg Electric Corporation.

An offer of $90,000 has been made by the Public Utilities Georgia Corporation for the water and light plant of Camilla, Ga., conditional upon the granting of a 25-year franchise. The corporation is a Foshay subsidiary.

The Western Public Service Company has purchased the municipal plant at Republican City, Neb., and the Central Power Company that at Kenesaw, each receiving a 25-year franchise. Transmission-line service will be given and the town of Prosser added to the list served by Central Power. The Iowa-Nebraska Light & Power Company has purchased the municipal lighting plant at Tekamah, Neb.

The Eastern Texas Electric Company of Delaware has disposed of its holdings in Texas and Oklahoma, forming the southern division of the Western Public Service Company of Colorado, to the Gulf States Utilities Company, and the properties in Colorado, Nebraska and Wyoming, composing the northern division, to the newly organized Western Public Service of Maryland, which has also absorbed the capital stock of the Nebraska Electric Power Company of Scottsbluff, operating in western and northwestern Nebraska, and of the Missouri Service Company.

Negotiations are in progress for the purchase by the Texas Power Company of the water rights and franchises of the Syndicate Power Company on the Colorado River. These holdings include permits for the construction of six dams and hydro-electric plants on that stream. The Syndicate Power Company was until recent months backed by the Insull interests.

With slightly over 51 per cent of property valuation signing in favor of the sale of the light plant of the city of Gravette, Ark., negotiations are under way to give title to the Benton County Utilities Company, present lessee, a Doherty subsidiary.

The Lander (Wyo.) Electric Light & Power Company has been sold to the Mountain States Power Company at a price said to be in the neighborhood of $175,000.

The electric and ice plants at Vici, Okla., and the electric lines and distribution systems in Seiling, Camargo and Taloga, Okla., have been purchased from the Earl W. Baker Utilities Company by the Oklahoma Gas & Electric Company. Improvements already started at Vici will be completed.

New Sponsors for "Light's Golden Jubilee"

Twenty new sponsors have been added to the committee of prominent citizens indorsing "Light's Golden Jubilee" which has been appointed under the honorary chairmanship of President Hoover. The names of 32 members of this committee were printed in the ELECTRICAL WORLD for May 11 (page 926). The new members are:

Addams, Jane	Howard, Roy W.
Angell, James R.	Kahn, Otto H.
Atterbury, W. W.	Morrow, Dwight W.
Dawes, Charles G.	Osborn, Henry F.
Eastman, George	Pershing, John J.
Gifford, W. S.	Pupin, Michael I.
Gildersleeve, Virginia	Robertson, A. W.
Green, Fred W.	Robinson, Henry M.
Green, William	Sippel, Mrs. J. F.
Houghton, A. B.	Sunny, B. E.

Features of Niagara "Jubilee of Light" Plans

Reference has already been made in the ELECTRICAL WORLD to the elaborate and spectacular celebration of "Light's Golden Jubilee" to be held at Niagara Falls on June 13, 14 and 15. This display, the fifth annual Niagara festival, will commemorate also the fiftieth anniversary of the use for lighting purposes of power generated from the Falls and the two hundred and fiftieth anniversary of the discovery of the cataract by Father Hennequin.

After this special celebration is over other lighting celebrations in the Niagara territory will follow. Among the plans adopted are the following:

All the street lights on the main thoroughfares at the city of Niagara Falls, N. Y., will be changed from white to golden hue.

Scores of retail business places will be decorated to show in contrast the lighting effects of 50 years ago and those of today.

Improved lighting, golden in color, will be applied to gasoline-service stations and similar places.

The Queen Victoria Park Commission, through W. D'Arcy Ryan of the General Electric Company, is arranging for an aërial drill and golden effects to be produced by the 24 immense searchlamps which illumine the Falls nightly.

The General Electric Company will transfer its broadcasting program over WEAF on Saturday, June 15, to Niagara Falls.

These celebrations are under the sponsorship of the Niagara Falls Chamber of Commerce, various civil organizations and the city officials, the light and power companies of the Niagara territory being also actively interested.

Utility Commission Engineers Meet at Washington

The seventh conference of state utility commission engineers was held on May 31 and June 1 at the Bureau of Standards in Washington. Among the subjects discussed at the meeting were rural electrification, street-lighting rates, electric service rules and long-distance manufactured gas transmission. Committee reports were presented on uniform types of rates and rate schedules, standard rural-line construction and depreciation. In order that the delegates might be left free to speak their minds, the sessions were not open to the public and details have not yet been released.

The paper on rural electrification, however, has been released by the author, George Charlesworth, of the Iowa State Railroad Commission. Mr. Charlesworth declares that the greatest improvement in agricultural efficiency is coming through labor saving by use of power on the farm rather than through increased yield per acre. Citing figures, he points out that, notwithstanding the advance in the science of agriculture, the yield per acre of corn in Iowa, for example, has increased only about 10 per cent in the past 60 years.

Commission engineers present at the conference represented the state regulating bodies of Alabama, California, Connecticut, Florida, Iowa, Maine, Maryland, Massachusetts, Minnesota, Missouri, Nevada, New Hampshire, New Jersey, New York, North Dakota, Oklahoma, Pennsylvania, Vermont, West Virginia, Wisconsin and Quebec.

In the Legislative Mills

ILLINOIS.—The eight Chicago traction bills are now ready for Governor Emmerson's signature, having passed both branches of the General Assembly. In the Senate they received an average vote of ten to one.

NEBRASKA.—Defeated in the recent legislative session, the League of Nebraska Municipalities is making preparations to submit for adoption at the 1930 election, by direct vote, a bill combining the principal features of the group of fourteen presented, only one of which was adopted and that one declared by league officials to be unworkable and undesirable, as amended. The more important of these bills have been summarized in the ELECTRICAL WORLD. Under the Nebraska constitution initiative petitions must be signed by 5 per cent of the voters in two-fifths of the state, or about 35,000 names in 38 counties. For adoption a majority of those voting on the proposal is necessary, if the total affirmative vote is 35 per cent of the total cast at the election.

Institute Gets Ready for Swampscott Meeting

Synchronizing, Transportation and Shielding in Electrical Measurements Are Prominent in the Technical Program—Whole Day Given to Trip

OF MUCH current interest are the topics to be covered by technical papers at the forthcoming summer convention of the American Institute of Electrical Engineers, which will be held at the New Ocean House, Swampscott, Mass., on June 24 to 28. They will deal with the synchronizing of distribution systems at the load, automatic synchronizing, outdoor hydrogen-ventilated synchronous condensers, loading transformers according to temperature, shielding in electrical measurements, electrical heating elements, high-frequency electrical tools, electrical machinery and communication. The first presentation of the Lamme medal will be made to A. B. Field of England. Prof. Harlowe Shapley of Harvard will deliver the usual evening lecture on June 25, and addresses from leaders are promised for the banquet on June 26, when the medal will be bestowed.

The whole of Thursday will be devoted to a trip to Rye Beach, Me. Other trips of engineering, scenic and historic interest will occupy the afternoons, together with sporting events and entertainment. Monday will be given up to registration, conferences and branch delegates' meetings, and Wednesday morning to committee reports, of which eighteen will be presented in two parallel sessions. This leaves Tuesday and Friday mornings for technical papers, and in addition some of a miscellaneous nature will be given on Wednesday afternoon. The program follows:

TUESDAY MORNING, JUNE 25

President's address, R. F. Schuchardt.

Parallel technical sessions—(1) Distribution and Power Generation: Symposium on "Synchronized at the Load"—(a) "Fundamental Plan," A. H. Kehoe, United Electric Light & Power Company; (b) "Theoretical Calculations of System Behavior," S. B. Griscom, Westinghouse Electric & Manufacturing Company; (c) "System Tests and Operating Connections," H. R. Searing and G. R. Milne, United Electric Light & Power Company. "Automatic Substations of Edison Electric Illuminating Company of Boston," W. W. Edson; "Rehabilitation and Rebuilding of Steam Power Plants," C. F. Hirshfeld, Detroit Edison Company; "Application of Induction Regulators on Alternating-Current Distribution Networks," E. R. Wolfert and T. J. Brosnan, Westinghouse Electric & Manufacturing Company.

(2) Transportation: "Electrification of the Mexican Railway," J. B. Cox, General Electric Company; "Contact-Wire Wear on Electric Railroads," I. T. Landhy, Illinois Central Railroad Company; "An Electrified Railroad Substation," J. V. B. Duer, Pennsylvania Railroad; "Direct-Current Railroad Substations," A. M. Garrett, Commonwealth Edison Company.

WEDNESDAY AFTERNOON, JUNE 26

"Master Reference System for Telephone Transmission," W. H. Martin, American Telephone & Telegraph Company, and C. H. G. Gray, Bell Telephone Laboratories; "Electrical Wave Analyzers for Power and Telephone Systems," R. G. McCurdy and P. W. Blye, American Telephone & Telegraph Company; "A New Automatic Synchronizer," F. H. Gulliksen, Westinghouse Electric & Manufacturing Company; "High-Frequency Portable Electric Tools," C. B. Coates, Chicago Pneumatic Tool Company; "Design of Electric Heating Elements," Edwin Fleischmann, Niagara Falls Power Company.

FRIDAY MORNING, JUNE 28

Electrical Machinery: "Safe Loading of Oil-Immersed Transformers," E. T. Norris of Ferranti, Ltd.; "Induction-Motor Operation with Non-Sinusoidal Impressed Voltages," L. A. Doggett and E. R. Queer, Pennsylvania State College; "Outdoor Hydrogen-Ventilated Synchronous Condensers," R. W. Wieseman, General Electric Company; "Short-Circuit Torque in Synchronous Machines Without Damper Windings," G. W. Penney, Westinghouse Electric & Manufacturing Company; "Analytical Determination of Magnetic Fields," B. L. Robertson and I. A. Terry, General Electric Company.

Shielding in Electrical Measurements: "Shielding and Guarding Electrical Measuring Apparatus," H. L. Curtis, Bureau of Standards; "Some Problems in Dielectric-Loss Measurements," C. L. Dawes, P. L. Hoover and H. H. Reichard, Harvard University; "Shielding in High-Frequency Measurements," J. G. Ferguson, Bell Telephone Laboratories; "Shielding of Cables in Dielectric - Loss Measurements," E. H. Salter, Electric Testing Laboratories; "Precautions Against Stray Magnetic Fields in Measurements with Large Alternating Currents," F. B. Silsbee, Bureau of Standards; "Magnetic Shielding in Electrical Measurements," S. L. Gokhale, General Electric Company.

Power Map of Flathead River Valley, Montana

The delta of the Flathead River, near Kalispell, Mont., has been mapped by the Geological Survey of the Department of the Interior, on a scale of 1 in. to 1,000 ft., with contour intervals of 2 ft. and 5 ft., and is now available for distribution.

This very detailed map was made in co-operation with the Rocky Mountain Power Company and the State of Montana at the request of the Federal Power Commission, as a part of the company's application for a license to develop power on the Flathead River.

Opposition to New-Kanawha Dam Is Overcome

Testimony was heard a short time ago by the Public Service Commission of West Virginia on the application of the New-Kanawha Power Company of Glen Ferris for permission to build a dam and power house on New River at Sandstone Falls. The plans for the dam provide for a dam built of concrete and steel, which would flood 460 acres of land including the riverbed and impound 1,600,000,000 gal. of water. About 20,000 hp. would be developed, it is estimated. The site of the proposed dam is on land owned by the Electrometallurgical Company, which, like the New-Kanawha Power Company, is a subsidiary of the Union Carbide Company of New York.

Objections were filed against the New-Kanawha company's application last winter by the West Virginia Hydro-Electric Company and the Chesapeake & Ohio Railroad Company. The Hydro-Electric company's own application was later withdrawn. The Chesapeake & Ohio announced at the hearing that it had no objection to the construction of a dam so long as adequate protection was furnished for the railroad's right-of-way. The New-Kanawha company assured the commission that this would be done by building an embankment 7,000 ft. long and 8 ft. wide at top.

Nebraska Rural Service and Interconnection

These Are the Two Topics Which Elicited Most Attention from the State Association, Meeting at Scottsbluff in Annual Convention.

TWO major problems of the industry aroused interest and provoked discussion at the twenty-third annual convention of the Nebraska Section of the National Electric Light Association, held at Scottsbluff very recently. These were rural electrification and interconnection. A sharp difference in plans and methods of handling the question of making the farmer a profitable and pleased patron developed. Three or four companies have been following the plan of contracting for a year minimum where the cost to reach a farm did not exceed $400, with a monthly service charge of $3.50 and a top rate of 7 or 8 cents. A bonus is asked if the cost exceeded $400.

The companies were found to be far apart in their estimates of average costs, owing to the varying methods of construction, the general opinion being that the three-phase system is the most reliable where motorized machinery is used. Where an average of two and a half customers to the mile, with a construction cost of $800 or $900 for that distance, has been obtained, the business is held to be profitable. Farmers who desire only lighting service are being discouraged as patrons.

An unlimited field was prophesied in those sections where irrigation is necessary, energy being used for pumping from wells at less cost than water is supplied to government ditch sections, with as low a rate as 2 cents.

F. J. Gunther of the Iowa-Nebraska Light & Power Company led the discussion on interconnection, giving the experience of his company in southern Nebraska. Here interconnection has made possible full twenty-four-hour service to all customers where only 20 per cent of the population were served in 1916. There has been a steady decrease in rates, which have fallen from a range of 7 to 30 cents, the rate thirteen years ago, to one of 3¼ to 13½ cents now. Volume of energy has been increased 400 per cent and voltage conditions have been perfected in many towns where neighbors formerly had to take turns using appliances.

R. T. Smalley, president of the Middle West Division, stressed the necessity of developing the industrial load during daylight hours and showed how this would make for cheaper rates.

C. N. Chubb, president of the Iowa-Nebraska Light & Power Company, discussed public relations policies and defended the use of school pamphlets, which has been attacked before the Federal Trade Commission. C. J. Strike of Huron, S. D., chairman of the North Central Division Commercial Section and vice-president of the Northwestern Public Service Company, told of advances made in mer-

chandising policies and methods, while Stanley Taber, general commercial manager of the Iowa-Nebraska Light & Power Company, outlined training for proper selling of appliances.

S. P. McFadden, Scottsbluff, general manager for the Western Public Service Company, was elected president, and Roy Page, Omaha, Nebraska Power Company, vice-president.

Idaho Power Company to Serve Minidoka Project

With the signing of a contract permitting the Idaho Power Company to use the surplus storage water in American Falls reservoir, the United States government now has 1,500 kw. of additional power available for the Minidoka gravity unit for summer use for irrigation, pumping and drainage. The lease is for ten years, at a yearly rental of $31,000. Other considerations include furnishing the Minidoka project with a maximum supply of 7,500 kw. of energy under certain conditions.

According to Claude Gleason, superintendent of power for the Minidoka project, the project is guaranteed 4,500 kw. of power during the summer months from the power company at any time it is needed, this power to be repaid during the winter at the rate of two kilowatt-hours for one. Where it is not possible to pay in power it will be repaid at the rate of 3½ mills per kilowatt-hour. Besides the 4,500 kw. guaranteed power, the power company agrees under the contract to furnish standby power to the project to the total of 3,000 kw., this power to be available in case of accident or breakage at the power plant at Minidoka dam. Two thousand kilowatts are now available through the present interconnection at Milner, and the remainder will come following the construction of an interconnection between the Minidoka power plant and the present line of the Idaho Power Company, 2½ miles north of the dam.

A. I. and S. E. E. Arranges Pittsburgh Program

At the twenty-fifth annual convention and exposition of the Association of Iron and Steel Electrical Engineers, to be held at the William Penn Hotel, Pittsburgh, June 17-21, the following program will be presented:

Monday, June 17—"Electrical Welding," S. S. Wales, committee chairman; "The Incorporation of Safety Into Electric Station Design," V. R. Bacon.

Tuesday, June 18—"Anti-Friction Bearings for Mill-Type Motors," F. D. Egan, committee chairman; "Electrical Developments in the Iron and Steel Industry," Walter H. Burr, committee chairman.

Wednesday, June 19—"The Selection of Electric Drives," L. A. Umansky.

Tuesday, Wednesday and Thursday mornings—"Utilization of Steam," L. C. Edgar; "Feed-Water Treatment," S. E. Hall; "Efficiency Versus Economy," H. G. Ebdon; "The Utilization of Waste Gases," Walter Flanagan; "Liquid Fuel," R. C. Vroom; "Economizers," Walter Keenan; "Gas Producers," F. E. Leahy, and "The Application of Pulverized Fuel in Industrial Furnaces," W. O. Renkin.

Friday, June 21—"Time Current Control for Direct-Current Motors," D. C. Wright.

Briefer News

POSTPONEMENT OF NEW YORK CITY FREIGHT ELECTRIFICATION ASKED.—The New York Central Railroad has petitioned the Public Service Commission for an extension until July 1, 1931, of the time for the complete electrification of its West Side freight line in the city of New York.

HENRY FORD RECEIVES ORIGINAL EDISON GALVANOMETER.—Henry Ford, who is erecting at Dearborn, Mich., a museum containing original apparatus used by Edison in developing his incandescent lamp, visited the Edison Lighting Institute of the Edison Lamp Works of the General Electric Company at Harrison, N. J., on May 23, in order that he might personally take back to Dearborn the original galvanometer used by Edison. This galvanometer

was presented to Mr. Ford by E. R. Scales at a ceremony in which officials of the Edison Lamp Works participated. It is a crude instrument consisting of two coils inclosed in a glass case, between which is suspended a magnetized needle which indicates by its motion the direction and size of electric current passing through the coils. It was used by Edison for measuring resistances of carbon filaments in trial lamps.

SALE OF EDISON POSTAGE STAMPS BEGINS.—Two policemen were sent to guard the little post office at Menlo Park, N. J., and clerks were transferred there to assist the postmaster, who normally runs the office alone. This was the outcome of the special jubilee postage stamp which went on sale there on Wednesday in honor of Edison. The first stamp sold went by mail to the inventor, the second to President Hoover and the third to Henry Ford. More than $1,000 worth were sold in the first half hour.

HIGH-VOLTAGE TRANSMISSION IN GREAT BRITAIN.—An important step in the electricity scheme for the central Scotland area, which will ultimately cost $25,000,000, was taken recently, when the current was switched on at Bonnybridge power station on the first 20-mile, 133-kv. overhead transmission line. The previous record voltage on any line in Great Britain was at Newcastle, where 66 kv. is employed. During the test at Bonnybridge the line was loaded to 145 kv. for three hours.

PROFESSIONAL BASEBALL MAY BE PLAYED BY FLOODLIGHT IN LOUISVILLE.—Night-time baseball on a floodlighted field is being seriously considered by the Louisville Baseball Club, blueprints of the grounds indicating the necessary installation being now in the hands of General Electric Company lighting experts. The management of the professional ball club is said to be favorably inclined toward the change, which would, it is thought, boost attendance. The chief concern is whether the light would be adequate in the case of balls sent high in the air or dropping far out.

BYLLESBY COMPANIES REDUCE RATES.—In addition to the rate reductions made by the San Diego Consolidated Gas & Electric Company (ELECTRICAL WORLD, May 25, page 1068), two other Byllesby companies in the West announce lower charges. In the Wyoming division of the Mountain States Power Company reduced power rates for large industrial and oil-field customers have become effective, and the company is doing all it can to bring industries into the territory. The California-Oregon Power Company has reduced rates for users of small motors and for large commercial cooking and heating customers.

ALLEGED DEFAMATION OF NEBRASKA COMPANY BRINGS SUIT FOR $100,000.—The Interstate Power Company has brought suit in Nebraska in the United States courts against the Neligh Electric Light Company for $100,000 damages on a charge that in an advertisement printed in a Neligh paper just prior to the starting of the competitive plant built there the Neligh Electric Light Company made false and defamatory statements tending to impugn the honesty and good faith of the Interstate company in its dealings with forty-odd towns in that section of the state, including Neligh, alleging that it had interfered to delay the construction of the Neligh plant and that its recent rate reductions had been forced. The Neligh plant was constructed by a subsidiary of the Western States Utilities Company.

CHATS FALLS HYDRO PLANS APPROVED AT OTTAWA.—An order-in-council has been passed in the Canadian House of Commons approving plans of the Chats Falls Power Company for a hydro-electric power development on the Ottawa River. The proposal, which involves an estimated outlay of $2,500,-

000, provides for the utilization of the head of water available immediately above Chats Falls and the water level of Lake Deschenes by works situated entirely within the Province of Quebec. The power station is to be near the lower end of the channel between Egan's Island and the Quebec shore and will be designed for an installation of two 15,000-hp. units operating at 37-ft. head. The station will be capable of extension so as to utilize the total flow of the Ottawa River at this point at a maximum head of 55 ft.

WHITE RIVER DAM IN ARKANSAS STILL WAITS.—Interest has been revived recently in the proposed hydroelectric power dam near Cotter, Ark., by the arrival of the government engineers to make an examination for the Federal Power Commission of the site at Wildcat Shoals, on the White River. The government permit for the construction of the dam expires soon, and the commission is understood to be reluctant to grant any further extension of time for beginning construction. The White River Power Company now holds the franchise, which in the past was the subject of a lively fight between contending interests.

COMPETITORS FOR BRITISH COLUMBIA HYDRO SITE ARGUE CASE.—The contest between several power companies for the rights at Campbell River, the largest undeveloped power resource on Vancouver Island, British Columbia, has been argued, finally boiling down until it was between the Vancouver Island Power Company, a subsidiary of the British Columbia Electric Railway Company, which is owned by the British Columbia Power Corporation, and the Canadian Utilities, Ltd., a subsidiary of the International Utilities, Ltd., which pooled issues with the Campbell River Power Company. If rights are granted to the last named by the Provincial Water Board, the International Utilities will finance the project.

REMINDER OF ST. FRANCIS DISASTER DESTROYED.—The portion of the St. Francis Dam of the Los Angeles Water and Power Department which was left standing when the dam gave way at midnight on March 12, 1928, has been destroyed. Two tunnels 50 ft. below the base of the dam were bored, and in them was placed 5 tons of high explosive, the charge being set off in such a manner as to break up the great rock and topple the pieces into holes prepared for them. This remaining portion of the dam was 160 ft. high, 90 ft. wide and 100 ft. thick at the base and contained approximately 45,000 tons of concrete.

NORTHWEST N.E.L.A. CONVENTION PROGRAM.—Although plans for the program of the Northwest Electric Light and Power Association's convention, to be held in Seattle June 26-28, are not quite complete, it is expected that through the medium of a talking motion picture messages will be brought to the convention from Thomas A. Edison, M. S. Sloan, and other nationally known figures in the electrical industry. Speakers scheduled include Prof. Karl E. Lieb, University of Washington, Seattle, and George E. Erb, former chairman Public Utility Commission of Idaho, Boise. One of the features of the convention will be a boat trip to Victoria, British Columbia, during which the Engineering Section will hold its sessions.

Coming Meetings

[A complete directory of electrical associations, with their secretaries, is published in the first issue of every volume. For latest list see issue for January 5, page 80.]

National Electrical Wholesalers' Association—Pacific Division Del Monte, Calif., June 13-15. E. Donald Tolles, 165 Boadway, New York.

North Central Electric Association—Breezy Point, Pequot, Minn., June 16-18. J. W. Lapham, 803 Plymouth Bldg., Minneapolis.

Association of Iron and Steel Electrical Engineers—Pittsburgh, June 17-21. J. F. Kelly, 1007 Empire Bldg., Pittsburgh.

Canadian Electrical Association — Algonquin Hotel, St. Andrew's by the Sea, N. B., June 19-21. H. M. Lyster, 712 Power Bldg., Montreal.

Pacific Coast Electrical Association—Del Monte, Calif., June 19-22. S. H. Taylor, 447 Sutter St., San Francisco.

Society for the Promotion of Engineering Education—Ohio State University, Columbus, June 19-22. F. L. Bishop, University of Pittsburgh, Pittsburgh.

Wisconsin Utilities Association — Accounting Section, Sheboygan, June 20-21; Electric Section, Wausau, July 18-19. J. N. Cadby, 432 Broadway, Milwaukee.

Empire State Gas and Electric Association—Accident Prevention Section, Watertown, N. Y., June 20-21; Commercial Section, Hotel Niagara, Niagara Falls, N. Y., June 20-21. C. H. B. Chapin, Grand Central Terminal, New York.

American Society of Agricultural Engineers—Baker Hotel, Dallas, Tex., June 24-27, Raymond Olney, St. Joseph, Mich.

American Institute of Electrical Engineers—Swampscott, Mass., June 24-28. F. L. Hutchinson, 33 West 39th St., New York.

American Society for Testing Materials—Chalfonte-Haddon Hall, Atlantic City, June 24-28. C. L. Warwick, 1315 Spruce St., Philadelphia.

Northwest Electric Light and Power Association—Seattle, June 26-28. B. Snow, 1206 Spalding Bldg., Portland, Ore.

Michigan Section, N.E.L.A.—Mackinac Island, July 1-3. Herbert Silvester, Edison Bldg., Ann Arbor, Mich.

American Society of Mechanical Engineers—Salt Lake City, July 1-4. C. W. Rice, 29 West 39th St., New York.

Camp Co-operation IX — Association Island, Henderson Harbor, N. Y., Aug. 2-6. Society for Electrical Development, 600 Graybar Bldg., 420 Lexington Ave., New York.

International Association of Electrical Inspectors, Western Section — Detroit, Aug. 26-28. W. S. Boyd, 175 W. Jackson Blvd., Chicago. International convention, Vancouver, B. C., Canada, Sept. 9-11. F. D. Weber, P.O. box 745, Portland, Ore.

International Association of Municipal Electricians—Boston, Aug. 27-30. H. N. Lang, Box 1864, Orlando, Fla.

National Association of Railroad and Utilities Commissioners—Glacier National Park, Mont., Aug. 27-30. J. B. Walker, 270 Madison Ave., New York.

FORT SMITH, ARK., DALLIES WITH IDEA OF A CITY LIGHT PLANT.—A contract with the Mississippi Valley Power Company to light the streets of Fort Smith, Ark., expired at the end of 1927 and was not renewed. Pressure from the Mayor on the City Commission to take action has led to a proposal from the city water department that a light and power plant be established in connection with the city waterworks. No definite action has yet been taken.

"LINDBERGH LIGHT" TO OUTRANK OTHER AERIAL BEACONS.—In commemoration of Lindbergh's historic flight to Paris, Elmer A. Sperry will donate an aviation beacon for installation on the new Palmolive Building, at Michigan Avenue and Walton Place, Chicago, which, it is said, will be more powerful than any now in use. A tower 135 ft. high will, it is reported, be built above the 37-story structure to house the beacon, which will give it an altitude of 600 ft., enabling it to be seen by aviators at great distances. The searchlamp is now under construction in the works of the Sperry Gyroscope Company, Brooklyn, N. Y.

NEW PLANTS FOR NEW YORK STATE.—The Public Service Commission of New York has given its approval to the construction of an electric plant by the Rochester Gas & Electric Corporation in Fillmore, Allegany County. The original franchise was granted to the Genesee Valley Power Company, now merged with Rochester Gas & Electric Corporation. To the Old Forge Electric Corporation permission has been granted to construct an electric plant in the town of Forestport and serve a territory extending from Forestport to the Herkimer-Oneida county line.

NEW UNIT FOR WAUKEGAN STATION.—A fourth unit has been ordered by the Public Service Company of Northern Illinois for the extension of its Waukegan generating station. The order, which has been placed with the Allis-Chalmers Manufacturing Company, includes a 65,000-kw. tandem steam turbo-generator with condenser, circulating water and condensate pumps. The new unit will be similar to the 50,000-kw. unit installed in 1927, except that it will be arranged for boiler reheat and will operate at 600 lb. pressure and 725 deg. total temperature.

FIRST UNIT OF NEW STATION AT NEW HAVEN GOES INTO OPERATION.—Two 15,625-kva. generating units, operating at 375 lb. pressure and 150 deg. superheat, have gone into operation at the new English station of the United Illuminating Company, New Haven, Conn. This station will when completed have a rating of 75,000 kw. It is being built in two sections, each of which will contain three units of the size first stated and six boilers. The boilers will operate normally at 200 per cent of rating, but stoker capacity sufficient to operate them at 300 per cent is provided. Heat balance is obtained through

the operation of duplex steam and electrically driven exciters. The change from one drive to the other is made automatically in accordance with the demand for exhaust steam to maintain a feed-water temperature of 220 deg.

IMPROVEMENTS TO SOUTHERN ALABAMA PROPERTIES CONTEMPLATED.—Improvements contemplated for plants of the River Falls, Opp, Andalusia and Pea River companies—the southern Alabama properties recently acquired by the General Water Works & Electric Corporation, some of which were damaged in floods last March, include the reconstruction of transmission lines from Troy to Opp and from Opp to Samson, provision of additional auxiliary power at a point yet to be determined, construction of a new concrete dam at the Gantt power plant, reconstruction of the earth dam at point A of the River Falls plant, rebuilding the flume of the Pea River plant and local distribution systems and secondary transmission lines, and erection of a transmission line in a gap between Glenwood and Irby.

CENTRAL ARIZONA LIGHT & POWER TO BUILD STEAM PLANT IN CO-OPERATION WITH WATER USERS' ASSOCIATION.—The Central Arizona Light & Power Company in co-operation with the Salt River Valley Water Users' Association will construct a steam-electric power plant at Phoenix, Ariz., to cost $2,500,000. The plant will have a capacity of 18,000 kw., which may eventually be increased threefold. Operation for two years is to be at a cost of the association under a contract that has had approval from the Secretary of the Interior, the local project being under federal ownership. Production costs are expected to run between 5 and 6 mills per kilowatt-hour, making it possible to decrease the present charges to farmers.

MIDDLE WEST DIVISION ARRANGES FOR SYSTEMATIC LINE PLANNING.—At a meeting of the special survey committee of the Middle West Division of the N.E.L.A. held on May 27 at Kansas City plans were adopted for a compilation which will be available for company managers in planning for construction and installation. Five maps are to be prepared, one for each of the four states composing the division—Iowa, Kansas, Nebraska and Missouri—and a composite one for the four states combined, the latter with summarized data. The state maps will give details of lines and systems in each, the number and location of generating plants and their capacity, designating whether municipal or privately owned; the capacity of the lines and voltage, the kind of poles and wire used, and all points of interconnection. Printed matter accompanying the maps will detail nature of holdings, whether energy is retailed or wholesaled, municipal systems served, a list of the towns arranged alphabetically by states with symbolic descriptive service statement, the installed capacity for each generating station, and peak-demand data.

MORE MONEY FOR MISSOURI COMMISSION.—The Missouri General Assembly prior to final adjournment on May 25 increased the annual appropriation for the Public Service Commission approximately $250,000 for the next biennial period to enable it to function more efficiently and speedily. The Assembly appropriated $600,000 to cover 1929 and 1930, compared with $385,640 for 1927 and 1928.

EMPIRE STATE ASSOCIATION MEETINGS.—The Commercial Section of the Empire State Gas and Electric Association will be held at Niagara Falls on June 20 and 21. M. E. Skinner will discuss merchandising policies, W. R. Dixon power sales promotion, President Charles S. Ruffner new commercial opportunities, John Costello rural electrification, and F. M. Houston and J. H. Van Aernam domestic electric sales promotion. On the same two days the Accident Prevention Section will meet at Watertown with a good program.

Commission Rulings

NO ALLOWANCE FOR PROMOTION OR FINANCING COSTS.—The Missouri Public Service Commission has in several cases, including the Laclede Gas Light Company valuation case and the last valuation and fare increase case of the St. Louis Public Service Company, refused to allow costs of financing to figure in utility valuations for rate making, except so far as these costs are a part of interest charges during the original construction of the plant. In a recent order the commission thus reiterates its stand: "This commission has expressed its position relative to costs of financing in a number of cases. Bond discounts and commissions, in so far as they are a part of interest during construction, are properly chargeable to capital account, but beyond that the cost of financing, or of assembling capital, should not be included in a valuation for rate-making purposes." The valuation findings, therefore, contains no allowance for promotion or financing.

JUSTICE OF A SERVICE CHARGE.—In granting an application from the Wauwatosa municipal waterworks for increased rates the Wisconsin Railroad Commission dealt with the fairness of a service charge, pointing out that the fixed expenses of which it is made up do not necessarily cease with temporary cessations in the use of service. Under such circumstances, it held, no allowance should be made for temporary vacancy of premises or for the facts that the customer may have used service for part of a billing period only. "Every customer is responsible," the commission said, "for certain operating expenses and for a certain demand upon the plant, as he exercises complete control of the service. Even if for considerable periods his demand is nothing, if his premises are still connected to the mains of the utility, the fact that the latter must carry his account on the books and be ready at all times to supply the service up to his maximum capacity would necessarily imply that, if costs are equitably apportioned, he will have to carry certain 'capacity' and 'consumer' expenses."

Recent Court Decisions

NO DAMAGES RECOVERABLE WHERE BOY CLIMBED UP GUY WIRE FOR NINE FEET AND REACHED PAST INSULATOR.—A nonsuit in Williams vs. City of Sumter has been sustained by the Supreme Court of South Carolina. Damages were sought because of injury to a ten-year-old boy who climbed for more than 9 ft. up a guy wire and then, coming to an insulator, reached beyond it and touched the upper part of the stay wire, which at its top extremity was in contact with a transmission line. Negligence was charged because this condition had arisen. The court held that the line was ordinarily safe for children playing and that the city could not be expected to anticipate the pranks of the injured boy. (147 S.E. 321.)*

INSUFFICIENT PLEA FOR RECOVERY OF DAMAGES BECAUSE OF DEATH OF MINOR SON.—The Court of Appeals of Georgia found, in Bridges vs. Georgia Power Company and another, that a petition to recover damages for death of plaintiff's minor son, alleging that the defendants maintained electric wires running through a tree on property used for a playground, that these wires became uninsulated, and that the decedent in climbing a tree came into contact with them, was thrown to the ground and sustained injuries resulting in death, did not show breach of any legal duty owed to the victim of the fatality, nor that injury naturally flowed from acts of defendant, and did not state a cause of action. (147 S.E. 589.)

DUTY OF INSURING SAFETY OF THOSE WORKING ON PROPERTY ABUTTING CHARGED WIRES.—The Court of Appeals of Georgia, in James vs. City of Albany, affirmed a judgment awarding damages because of injury to a man working on a building which abutted on an alley where the city maintained electric lines with which he came in contact. The lines were installed within 12 in. or 15 in. of the premises where the man was working, and the court held that the maintainer of highly charged wires on his own premises was bound to exercise due care to obviate danger to any person on adjoining premises, even though this person might be employed by an independent contractor, who owed him the duty of furnishing a safe place to work. (147 S.E. 396.)

DAMAGES FOR FLOODING ROAD AND PATHS LEADING TO PLAINTIFF'S LAND SUSTAINED.—In Grant vs. Tallassee Power Company the plaintiff asked damages because of the flooding of land owned by him on a mountainside and valuable chiefly for the timber on it. Prior to the construction of a dam by the company, the land was accessible by a road which ran within 200 yards of it, cartways running from this road to the land. The road and the cartways were flooded, though the water did not flood plaintiff's land or any part thereof. The jury found that the company wrongfully destroyed plaintiff's means of access to and from his land and awarded damages of $816. The North Carolina Supreme Court held that there was ample evidence to sustain the verdict. (146 S. E. 531.)

*The left-hand numbers refer to the volume and the right-hand numbers to the page of the National Reporter System.

News About Electrical Men

F. C. Frary New President of Electrochemical Society

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Dr. Francis C. Frary, director of research of the Aluminum Company of America, was elected president of the American Electro-Chemical Society, at the meeting held recently in Toronto. Minneapolis is Mr. Frary's native city and the University of Minnesota his alma mater. Following graduation, he spent ten years on the teaching staff of that institution before he entered the employ of the Oldbury Electrochemical Company, Niagara Falls, in the capacity of research chemist. Since 1919 he has been director of research of the Aluminum Company of America.

Dr. Frary is joint inventor, with Dr. S. Temple, of "Frary metal," a popular bearing metal manufactured by the United Lead Company and used by various large industrial companies. He perfected the process of manufacturing phosgene on a large scale, later used at Edgewood Arsenal, where he was jointly responsible with Major D. J. Demorest for the design and construction of the largest phosgene manufacturing plant in the world. He is a member of the American Chemical Society, American Electrochemical Society, American Institute of Mining and Metallurgical Engineers and the Institute of Metals.

C. L. Kasson of Boston Resigns

Charles L. Kasson has resigned as superintendent of the department of standardizing and testing of the Edison Electric Illuminating Company of Boston, having headed that branch of the organization since 1920. He has been in the company's testing work since 1907, became head of the electrical division of the laboratory in 1910 and assistant superintendent in 1918. Mr. Kasson has been active in national engineering organizations and has been a prolific writer upon the philosophical aspects of electrophysics, apart from his executive interest in and supervision of test engineering problems and research. He has contributed to the progress of invention in test instrument fields and has been influential in establishing reciprocal relations between various educational institutions and the Edison company in research lines. Mr. Kasson has been retained as a consultant to the department which he has lately headed and plans to engage in private practice.

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Hamilton Heads Boston Edison Laboratory

Harold C. Hamilton, for the past five years assistant superintendent of the department of standardizing and testing of the Edison Electric Illuminating Company of Boston, Mass., has been appointed superintendent of the department. Mr. Hamilton is a native of Maine and entered the electrical industry through a connection with the construction department of the Presumpscott Electric Company, at Westbrook, Me., about twenty years ago. In the fall of 1909 he entered the employ of the Boston Edison company as a steam testman, and later was occupied with a wide variety of electrical testing. He became head of the electrical testing division in 1920. He is chairman of the underground systems committee of the New England division, N. E. L. A., and has been active in the American Society for Testing Materials.

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EDWARD W. JUDY, operating manager of the Duquesne Light Company, Pittsburgh, was elected vice-president and general manager of the company at a recent meeting of the board of directors.

JEAN L. RILLIET, JR., has been appointed director of public utilities for St. Louis by Mayor Victor J. Miller to permanently fill the vacancy caused by the recent resignation of John C. Pritchard. Mr. Rilliet has been in the city service for thirteen years, having been an engineer in the water department, chief electrical engineer in charge of the power plant at the City Hall, in charge of electrical inspections, and division engineer. In 1926 Mr. Rilliet served for a short time as director of public utilities until Mr. Pritchard was appointed.

L. E. DAVIS, formerly chief engineer of the Baton Rouge (La.) Electric Company, has been appointed chief engineer of the Western Public Service Company at Laramie, Wyo. Before his connection with the Baton Rouge utility Mr. Davis was identified with the Gulf States Utilities Company at Beaumont and previously had held positions with Stone & Webster companies in Jacksonville, Pensacola and Key West, Fla.; in Savannah, Ga., and in Orange, Tex.

Cobb and Martin Head Commonwealth & Southern

B. C. Cobb and Thomas W. Martin, both prominently identified with the electric light and power industry, have been named chairman of the board and president respectively of the Commonwealth & Southern Corporation, the new holding company which has acquired large blocks of the common stocks of the Commonwealth Power Corporation, the Southeastern Power & Light Company and the Penn-Ohio Edison Company. Mr. Cobb is chairman of the board of the Allied Power & Light Corporation and president of the Commonwealth Power Corporation and Mr. Martin is president of the Southeastern Power & Light Company.

Mr. Cobb has been identified with the management of public utility properties since 1895. For 23 years he was connected with Hodenpyl, Hardy & Company, Inc., and when that company was consolidated last year with Stevens & Wood interests to form the Allied Power & Light Corporation, he was serving as a vice-president and as an operating official of many of its subsidiaries. Mr. Cobb is a director of the American Superpower Corporation.

Mr. Martin, who has been one of the chief contributors to the electrical development of the South, entered the public utility field in a legal capacity — to be exact, as general counsel of the Alabama Power Company. That was in 1912, the year in which the Alabama company was organized. At that time he was well informed on the hydro-electric developments of the state, as a lawyer having represented many of the state's water-power pioneers. In 1916 Mr. Martin was made vice-president and in 1920 he advanced to the presidency. Mr. Martin is a native of Alabama and a graduate of the law department of the University of Alabama. He has been active in the National Electric Light Association, being a past-president of the Southeastern Geographic Division.

HARLEIGH H. HARTMAN and MAJOR GENERAL MASON M. PATRICK have been appointed members of the Public Utilities Commission of the District of Columbia, Washington, D. C.

GEORGE R. JONES, vice-president of the Industrial Electric Company, Minneapolis, and OSCAR M. FRYKMAN, chief electric inspector of Minneapolis, have been appointed by Gov. Theodore Christianson of Minnesota to serve on the state board of electricity.

Financial and Statistical News

IN THE most active market for utility stocks this year the public utility common stocks recovered sharply from last week's selling and many issues went well over previous tops, with money continuing easy. Buying was heavy in the case of stocks being acquired by some of the large investment companies and there was also considerable short covering as well.

SUBSTANTIAL GAINS IN THE MOVEMENT were made by American Superpower, Allied Power & Light, Buffalo, Niagara & Eastern, Southeastern Power & Light, Electric Investors, American Gas & Electric, etc. Gains of several points were made almost all along the line during the early part of the week.

Rockland to Call Preferred

The entire outstanding issue of $50 par preferred stock of the Rockland (N. Y.) Light & Power Company will be called for redemption at $55 per share August 1, according to a recent vote of the directors announced by Col. Charles H. Tenney, chairman of the board. The amount outstanding is $6,000,000. This stock is convertible into common stock on the basis of one common share of $10 par value for each 13/50 share of preferred stock. It has also been recommended by the directors that the par value of the common stock be reduced from $50, the present par, to $10, and that the total number of shares of stock outstanding be increased from 520,000 to 2,120,000 shares. The preferred has been paying 6 per cent on par and the common 9 per cent per year.

ASSOCIATED GAS & ELECTRIC ANNOUNCES RIGHTS.—Rights will be issued to holders of record of class A, class B and common stocks of the Associated Gas & Electric Company at the close of business on June 14, 1929, entitling them to subscribe for one share of class A stock for each four shares then held. The "rights" will be mailed on or about June 29, 1929, and will expire at the close of business on July 23, 1929. The subscription price will be $42 per share. The market price during recent months has ranged between $53 and $61 per share. Interest at the rate of 6 per cent per annum will be paid on all full paid subscriptions from date of receipt to August 1, 1929, when dividends will begin to accrue on the class A stock. Subscriptions may be paid in installments, upon which interest at the rate of 6 per cent per annum will be allowed from respective dates of payment to the date on which dividends begin to accrue on the class A stock subscribed and paid for, which will be the regular dividend date next succeeding payment in full.

ITALIAN UTILITY REPORTS GAIN.—Gross earnings of the Edison General Italian Electric Company of Milan for the year ended December 31, 1928, were 249,038,051 lire, against 208,512,873 lire in 1927. Net earnings after bond interest were 98,567,721 lire, against 88,393,446 lire in 1927. Out of the profits for the year 1928 the company has paid a dividend of 94,026,128 lire, as compared with 80,658,702 lire in the year 1927. In accordance with European custom the company pays its dividends out of the profits of the preceding years' operations. The increase of 13,367,426 lire in dividends makes the payment for 1929 at the rate of 50 lire per share against 45 lire per share on the ordinary shares and 37 lire against 32 lire on certain other shares for the preceding year.

Central Illinois Light Reports Successful Year

Gross earnings derived from the various departments of the Central Illinois Light Company amounted to $4,765,845, as compared with $4,391,161 during the preceding year, and the sums contributed by the various departments were in approximately the same proportions as those for the preceding year—72 per cent from the electric department, 22 per cent from the gas department and 6 per cent from the heating department. Operating expenses necessary to handle the increased volume of business done in 1928 increased less than 5 per cent over the preceding year, with the result that after deducting from gross earnings the operating expenses and taxes the gross income for the year showed an increase of 11.9 per cent over 1927. The accompanying table shows how each dollar of gross earnings is spent.

	Cents
Material and supplies	40.64
Labor	10.39
Taxes	8.09
Interest and fixed charges	7.56
Preferred stock dividends	8.58
Retirements	6.40
Balance	18.34

Electric sales advanced from 122,265,494 kw.-hr. to 143,027,409 kw.-hr. and electric customers from 38,274 in 1927 to 39,875 during 1928.

BUFFALO, NIAGARA & EASTERN POWER CORPORATION DECLARES EXTRA DIVIDEND.—The Buffalo, Niagara & Eastern Power Corporation declared an extra dividend of 30 cents on class A stock and the regular quarterly divided of 30 cents, both payable July 1 to stock of record June 15.

Current Earnings Reports of Electric Light and Power Companies

	1929	1928	Per Cent Increase	Operating Ratio 1929	Operating Ratio 1928
Carolina Power & Light (Year ended March 31)					
Gross earnings	$9,110,724	$8,964,720	2.0	47	53
Net earnings	4,867,127	4,164,704	17.0	..	..
Cities Service (Year ended April 30)					
Gross earnings	36,902,526	32,928,978	12.1	..	..
Net earnings	35,708,912	31,816,734	12.2	..	..
Commonwealth Power & Subs. (Year ended April 30)					
Gross earnings	60,475,445	54,802,502	10.4	51	53
Net earnings	29,400,572	25,755,946	14.2	..	..
Detroit Edison (Year ended April 30)					
Gross earnings	54,310,117	48,901,733	11.1	65	66
Net earnings	18,934,809	16,431,988	15.3	..	..
Federal Light & Traction & Subs. (Year ended March 31)					
Gross earnings	8,107,088	7,193,610	12.7	57	59
Net earnings	3,506,013	2,919,166	20.1	..	..
Illinois Power & Light & Subs. (Year ended March 31)					
Gross earnings	35,676,265	31,698,994	12.5	53	55
Net earnings	17,079,713	14,052,108	21.6	..	..

	1929	1928	Per Cent Increase	Operating Ratio 1929	Operating Ratio 1928
Milwaukee Electric Railway & Light (Year ended March 31)					
Operating revenues	$30,212,560	$27,604,736	9.4	67	67
Net revenue	9,986,869	8,909,402	12.0	..	..
New York Power & Light (Year ended April 30)					
Gross earnings	20,944,202	19,374,629	8.1	56	59
Net earnings	9,122,086	7,879,797	15.8	..	..
Penn-Ohio Edison & Subs. (Year ended April 30)					
Gross earnings	28,370,674	26,643,580	6.5	59	63
Net earnings	11,410,847	9,901,684	15.2	59	63
Tennessee Electric Power (Year ended April 30)					
Gross earnings	13,712,553	12,783,206	7.3	51	55
Net earnings	6,703,705	5,826,593	15.1	..	..
Texas Power & Light (Year ended March 31)					
Gross earnings	9,587,178	9,440,463	2.0	50	56
Net earnings	4,737,441	4,168,322	14.0	..	..
United Light & Power & Subs. (Year ended March 31)					
Gross earnings	90,638,883	85,669,346	5.8	58	61
Net earnings	37,807,231	33,238,212	13.7	..	..

Associated Gas Announces Terms for Stock Exchange

The Associated Gas & Electric Company has announced a series of offers whereby its stock and those of companies it controls may be exchanged for its class A stock and debentures. The terms are as follows:

Holders of Associated Gas $6.50 preferred, $7 preferred and original series preferred may convert their preferred stock into class A stock before June 10 and receive rights on the class A stock. The terms of exchange are: For each share of $6.50 and $7 preferred stocks, two shares of class A stock in the form of convertible debenture certificates, exchangeable for class A stock after six months. An alternative offer is for $105 par value of Associated Gas & Electric 6 per cent convertible debentures. Original series preferred stockholders are to receive one share of class A stock in the form of convertible debenture certificates, or $60 par value of 6 per cent convertible certificates, for each original series preferred share.

Binghamton Light, Heat & Power Company $5 preferred and $6 preferred stockholders are to receive for each share two shares of Associated class A stock in form of convertible debenture certificates, or $110 par value of the 6 per cent convertible debentures of Associated Gas & Electric Company.

Holders of the $7 preferred stock of Eastern Utilities Investing Corporation, are to receive the same terms, as are the Northern Pennsylvania Power Company $7 preferred and $6 preferred-stock holders.

Holders of participating preference stock of Clarion River Power Company are to receive for each share of their stock 0.2 of a share of Associated class A stock or $10 par value of Associated 6 per cent convertible debentures.

Metropolitan Edison Company stockholders receive the following terms of exchange: For each share of common stock, four shares of Associated class A stock, or $250 in Associated 6 per cent convertible debentures; for each share of $5, $6 and $7 preferred stock, two shares of Associated class A stock, or $110 in Associated 6 per cent convertible debentures.

Preference stockholders of Erie Lighting Company are to receive for each share of their stock nine-tenths of a share of Associated class A stock, or $50 in the 6 per cent convertible debentures.

Florida Public Service Company 7 per cent preferred stockholders and Broad River Power Company 7 per cent preferred-stock holders are to receive for each share of their stock two shares of Associated class A stock, or $110 in the 6 per cent convertible debentures. The same terms are offered $6 and $5 preferred stockholders of New Jersey Power & Light Company.

Empire Power & Light 6 per cent and 7 per cent preferred stockholders are to receive for each share of stock two shares of Associated class A stock, or $105 in convertible 6 per cent debentures. Holders of 7½ per cent preferred of Empire Power & Light are to receive for each share of their stock two shares of Associated class A stock, or $103 in the 6 per cent convertible debentures.

Holders of Lockport Light, Heat & Power Company 6 per cent and 7 per cent preferred stocks are to receive for each share two shares of Associated A stock, or $105 in the convertible debentures.

Holders of Rochester Gas & Electric 7 per cent preferred stock are to receive for each share two shares of Associated class A stock or $105 in the 6 per cent convertible debentures. Rochester Central Power 6 per cent preferred-stock holders are to receive one and eight-tenths shares of Associated class A stock for each share of their stock, or $100 in the 6 per cent convertible debentures.

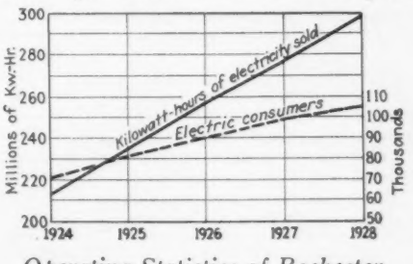
Class B common stockholders of General Gas & Electric Corporation are to receive for each share of stock two shares of Associated class A stock, or $110 in 6 per cent convertible debentures. Holders of General Gas & Electric dividend participation stock may exchange each participation share for one-half share of Associated class A stock, or $30 in 6 per cent convertible debentures. General Gas & Electric $7 preferred-stock holders are to receive for each share of stock two and one-tenth shares of Associated Gas & Electric Company's class A stock, or $120 in convertible debentures of that company.

General Gas & Electric $8 preferred class A stockholders are to receive for each share of their stock two and three-tenths shares of Associated Gas & Electric A stock, or $135 in convertible debentures.

Rochester Utility Reports Signal Progress in 1928

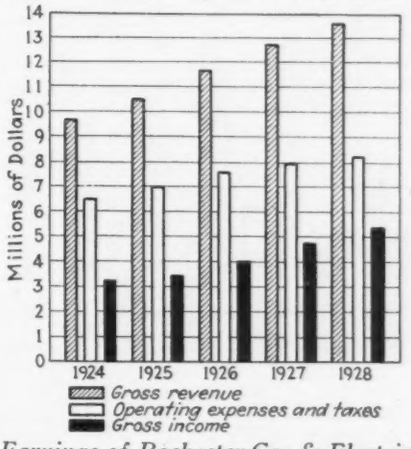
THE year 1928 proved to be another successful chapter in the history of the development of the Rochester Gas & Electric Corporation both from the operating and financial point of view. Gross earnings advanced from $12,730,829 in 1927 to $13,645,433 in 1928, an increase of 7.18 per cent, while operating expenses decreased from $6,559,155 in 1927 to $6,501,727 in 1928, or 0.88 per cent. "This very satisfactory operating result," according to the year book, "was accomplished by aggressive sales promotion in the domestic and industrial branches of the several departments, coupled with reasonable economy of expenditure and careful purchasing of essential fuels, materials and supplies." To the total revenue the electric department contributed $8,344,573, as compared with $7,729,042, an increase of 7.96 per cent. After all expenses and taxes had been deducted gross income amounted to $5,385,709, an increase of 13.20 per cent over the sum recorded for 1927.

Total current assets at the close of 1928 amounted to $4,599,503, as compared with $3,856,826 at the close of 1927. During the year facilities to the value of $3,900,871 were added to the fixed capital account. This reduced program was mostly confined to the distribution departments for extensions of underground conduits, pole lines, transformers, meters, mains and services.



Operating Statistics of Rochester Utility

A total of $4,329,846 was invested by the company in construction work during the year 1928. Of this amount, $2,827,948 represented the requirements of the electric department, $651,112, those of the gas department, $576,250 went into steam construction and $274,250 was spent for miscellaneous other buildings and equipment. Electric construction expenditures included the following items: $88,330 for land, $197,335 for buildings, $511,598 for station apparatus, $229,055 for street-lighting poles, fixtures, etc., and $1,801,630 for conduit, poles, cable, wire, transformers and meters.



Earnings of Rochester Gas & Electric Corporation Since 1924

The total capacity of electric plants increased from 118,580 kw. to 123,505 kw., or 4 per cent; sales of electricity increased by a total of 22,434,973 kw.-hr., or 9 per cent. The peak load for the year made an integrated demand upon the company's stations totaling 75,290 kw., which is the largest in the history of the company. The kilowatt-hours generated and purchased totaled 376,764,523, and of this total, 116,642,695 kw.-hr. were generated in steam plants,

214,532,786 kw.-hr. by the Genesee River and 45,589,042 kw.-hr. was purchased from Niagara.

The accompanying tabulation shows the growth of the Rochester Gas & Electric Corporation covering a ten-year period.

Operating Statistics Showing Ten-Year Growth

	1928	1918	Per Cent Increase
Plant and equipment	$62,922,750	$28,992,859	117.03
Gross revenue	13,645,443	5,983,903	128.04
Electricity sold (kw.-hr.)	299,114,182	161,572,023	85.13
Electric consumers	105,651	28,907	265.49
Hydraulic capacity (kw.)	46,530	39,990	16.35
Steam capacity (kw.)	76,975	46,475	65.63
Total capacity (kw.)	123,505	86,465	42.84

VIAG PLANS CAPITAL INCREASE.—An increase in the share capital of the United Industrial Corporation (Viag), one of Germany's largest industrial and electric holding corporations, from 120,000,000 reichsmarks to 160,000,000 reichsmarks, has recently been announced. All the shares will be subscribed by the Reich, at a price of 147 reichsmarks for 100 reichsmarks par value and will be paid for partly with cash and partly with properties. During the fiscal year ended March 31, 1929, nearly all the operating companies in which Viag holds participation paid substantial dividends.

COMMONWEALTH POWER REPORTS INCREASED SALES OF ELECTRICITY.—Activity of general business in the territory served by Commonwealth Power Corporation system is reflected in substantial increases in the consumption of electricity. Sales of electricity in April totaled 170,500,640 kw.-hr., as compared with 147,671,611 kw.-hr. in April last year, an increase of 15.46 per cent. For the first four months of 1929 electric sales were 670,476,114 kw.-hr., as compared with 594,172,027 kw.-hr. for the first four months of last year, a gain of 12.84 per cent. For the twelve months ended April 30, 1929, electric sales were 1,888,784,768 kw.-hr., as compared with 1,649,685,325 kw.-hr. for the twelve months of last year, an increase of 14.49 per cent.

Superpower Splits Stock Five for One

At meetings of the stockholders of the American Superpower Corporation and of the Utility Shares Corporation held in Delaware June 4 the merger of these companies, to continue under the name of the American Superpower Corporation, was unanimously approved. At the same meeting American Superpower stockholders voted to change the present two classes of common stock into one class of common stock, each share of which will be entitled to full voting rights; the present class A and class B common stock to be exchanged for the new common stock on a ratio of five new common shares for each share of class A or class B common stock now held.

As a result of the merger and five-for-one split-up, the outstanding capitalization of American Superpower will consist of 8,243,006 common, 267,164 preference and 400,000 first preferred shares, valued in excess of $426,671,000. The authorized capitalization of the company is now 750,000 first preferred, 400,000 preference and 15,000,000 common shares.

In addition to its large holdings in the two utility investment companies formed under its auspices, American Superpower is one of the largest holders of the Electric Bond & Share Company's stock, in the National Power & Light Company and in the United Illuminating Company of New Haven. American Superpower early this year acquired 50 per cent of the voting stock of the Italian Superpower Corporation, which it participated in founding. Through large direct holdings in the American & Foreign Power Company, Inc., in addition to its interests in Electric Bond & Share, it participates also in the utility industry of Latin America and the far East.

New Issues in May Total $71,810,000

NEW public offerings by the electric light and power companies of the country of bonds, notes and stocks amounted to $71,810,000 during the month of May, as compared with $123,342,000 during the same month of 1928. The five-month period closed with a total of $517,855,500, as against $733,283,852 for the similar period of the prior year, a decrease of $215,428,352.

The largest individual issue was offered by the United Light & Power Company in the form of cumulative convertible first preferred stock, a piece of financing involving a total of $50,000,000. Long-term financing again predominated and the average yield amounted to 5.93 per cent.

New Security Issues of Electric Service Companies in May

Name of Company	Amount of Issue (Par Value)	Period, Years	Class	Purpose	Interest Rate	Price	Per Cent Yield
American Commonwealths Power Corp.	$4,000,000	20	Gold debentures	Acquisition of gas properties and for other corporate purposes	6	97	6.25
United Public Utilities Co.	1,000,000	18	First lien gold bonds, series C		6	99	6.05
Gulf States Utilities Co.	9,000,000	27	First mortgage and refunding gold bonds, series A	To finance the purchase of new properties and to reduce floating debt	5	94	5.42
Lincoln Power Co.	600,000	1	Mortgage gold notes	To retire certain funded debt, to reimburse for expenditures made for additions and improvements, for additional working capital and corporate purposes	5	98½	6.80
Houston Lighting & Power Co.	2,000,000	24	First lien and refunding mortgage gold bonds, series A	To reimburse the company in part for expenditures made in connection with the enlargement of its property	5	98½	5.10
American States Public Service Co.	2,000,000	9	Convertible gold debentures, series A	Proceeds to be used in connection with the acquisition of additional properties and for other corporate purposes	6	97½	6.35
United Light & Power Co.	50,000,000	..	Cumulative convertible first preferred stock	To retire securities of the company and its subsidiaries and in part to increase its working capital	6	100	6
Central States Edison Corp.	450,000	20	Gold debentures, series A (with stock purchase warrants attached)	To defray a part of cost of acquiring additional properties and for other corporate purposes	6	99	6.08
	260,000	..	Common stock		..	6½	....
Intercontinents Power Co.	2,500,000	..	Common stock, class A	To pay in part obligations incurred in acquisition of properties, to provide funds for future acquisitions and for other corporate purposes	..	25	....
Total	$71,810,000			Rights	$43,827,060		
Total amount actually realized	71,045,000			Total financing for May	114,872,060		

Business News and Market Conditions

ORDERS for various classes of heavy equipment, especially generators and turbines, throughout the Eastern part of the country are keeping up better than was anticipated. Fractional-horsepower motors are also active.

SWITCHING EQUIPMENT AND SMALL PRODUCTS are the feature of Southeast business.

IN NEW ENGLAND several of the power companies are buying switch and control equipment and other day to day requirements.

POLE LINE AND SUBSTATION MATERIAL feature the week's business in the St. Louis area. Generally speaking, Middle West business is normal.

TRANSFORMERS AND OTHER POWER COMPANY EQUIPMENT, especially pumping motors, are in active demand in the Pacific Coast area.

Sales Continue Satisfactory in the Southeast

Satisfactory conditions continue to be reported for the Southeast, with more activity noted in industrial than in the central station lines. A power company in Louisiana placed orders for transformers, switching equipment and regulators amounting to $50,000, while a Georgia company's creosoted pine pole orders aggregated $5,700. One of the smaller power companies in Georgia ordered small power transformers totaling $5,500, while another transformer order placed amounted to $5,700. Bids have been asked on four 10,000-kva. transformers for installation in Alabama and the order will probably be let within the next few weeks. Two textile mills in South Carolina were responsible for two textile motor orders totaling $80,000, and a Georgia tire fabric manufacturing plant ordered $10,000 worth of wiring supplies. An industrial plant in Alabama ordered small power transformers costing $1,500. A silk knitting mill to be constructed in Tennessee will let electrical contracts within the next few weeks calling for $10,000 in electrical materials, while another silk knitting mill in the same state expects to let a contract within six weeks and its electrical material requirements will also approximate $10,000. A cotton mill in Georgia will construct an addition to its plant calling for 500 hp. in motor equipment and $2,500 in wiring supplies. About 157 "Whiteway" standards were ordered for installation in Atlanta, Ga., while one of the small towns in Georgia ordered $2,000 in wiring supplies for a new city hall. Construction projects are as follows:

Norfolk, Va., plans a floodlighting system and beacon lamps at the proposed municipal airport. The Massanutten Power Company, Shenandoah, Va., plans extensions in its power plant to cost $100,000. The Eagle Convex Glass Specialty Company, East Clarksburg, W. Va., plans expansion to cost $150,000. The United Zinc Smelting Corporation, Moundsville, W. Va., plans extensions to cost $175,000. The Brown-Williamson Tobacco Corporation, Louisville, Ky., plans an addition to cost $100,000. The Buckeye Cotton Oil Company, Memphis, Tenn., will make extensions in its power plant to cost $30,000. The Murray Corporation of America, Detroit, plans a second unit for its woodworking plant at Memphis, Tenn., to cost $1,000,000. The Liggett & Myers Tobacco Company, Durham, N. C., will build an addition to cost $300,000. The Carolina Power & Light Company, Raleigh, N. C., plans extensions in the transmission lines at Manning, S. C., and vicinity. The Dunlap Chemical Company, Jackson, Miss., plans a plant to cost $85,000. Atlanta, Ga., plans an ornamental lighting system. The Georgia Power Company, Atlanta, Ga., plans a power substation to cost $40,000 and a transmission line to Warm Springs, and vicinity. The Mandeville Mills, Carrollton, Ga., plan the electrification of the cotton mill, to cost $60,000. Columbus, Ga., plans a floodlighting system and beacon lamps at its proposed municipal airport.

Power Equipment Orders Lead New England Buying

Power equipment orders are active in the New England district. Small motor sales continue in good volume one manufacturer recording sales amounting to over $50,000. Interest in large power motors for pump units is noted and a number of municipal pumping installations are projected requiring motors up to 900 hp., the orders for which will be placed soon. Scheduled materials are in active demand and meter sales are strong while small switch and control equipment is steady. Power station enlargements are reflecting activity in special switches and recently an order for new control amounting to $2,200 was received and others for $1,400 and $2,800 are noted. Heavy generating equipment orders are pending and an order for a 30,000-kw. turbo-generator for Western delivery was placed recently and others for Middle West and Eastern points are under consideration. Central-station supplies are steady. The transformer sales reported by one manufacturer are above last year and line extensions are numerous; buying is more active. Line supply orders are gaining while hardware and crossarms are moving in good volume. The general equipment orders recently placed by one manufacturer reached over $32,000 for locations in eastern Massachusetts. Construction projects are as follows:

The Boston Spaghetti Manufacturing Company, Boston, plans an addition to its factory to cost $80,000. The Keyes Container Corporation, Boston, plans a plant for manufacture of paper containers, to cost $100,000. The Malden Electric Company, Malden, Mass., contemplates an equipment storage and distributing plant. The New Departure Manufacturing Company, Bristol, Conn., plans a second addition to its ball bearing plant to cost $200.000.

Orders Increase in Eastern District

Business continues at a most satisfactory rate in the Eastern district. The past week has developed an accumulation of orders of sizable character, with both central stations and industrial interests figuring in the buying. Inquiries are holding up well and the desire for early delivery of anticipated purchases indicates some prompt commitments just ahead. A power company in northern New York has placed a contract with a State manufacturer for a 100,000-kva. turbo-generator and auto-transformer to cost $875,000. A central station in Ohio has given an order for transformers and switchgear to an amount of $60,000. Another power interest in western Pennsylvania has purchased similar equipment from a New York maker to cost $80,000, while a metropolitan central station has placed a commitment for transformers for substation service to a sum of $25,000. Apparatus of this character is extremely active and there is substantial business ahead.

Industrial companies are showing up strong in the market aggregate, with steel mills and the metal-working plants placing the heaviest volume of business. A western Pennsylvania manufacturer has secured a contract for generator units, motors and auxiliaries for a steel mill installation at Leechburg, Pa., to cost $250,000. Chemical plants show expanding account, with aircraft and automobile plants closely following. A manufacturer of motors reports an excellent call for small capacity general purpose units. Fractional-horsepower motors are receiving good attention and a maker of talking machines in Connecticut has placed an order with a New York producer for a quantity of such units to an amount of $40,000. A manufacturer of oil-engine generator sets for industrial service, as well as small municipal power stations, is recording substantial business from Southern and Mid-Western districts. A maker of control apparatus reports a substantial volume of current business, with the bulk of account centered in industrial and marine installations.

Account for high-tension porcelain insulators is developing very satisfactory totals according to a leading maker. The heaviest orders are coming from

power companies and railways. A steam railroad at New York has entered the market for car equipment with an order totaling $80,000 and other business of this same kind seems close at hand. The steam lines evidently are entering the market for requirements after a rather extended period of inactivity. Construction projects are as follows:

The Keller Mechanical Engineering Company, Brooklyn, will build a plant at Bellwood Park, Belleville, N. J., to cost $200,000. The Chrysler Motor Company, New York, will build a service, repair and sales building to cost $500,000. The Truscon Steel Company, Youngstown, Ohio, and New York, plans a factory branch and distributing plant at Harrison, N. J., to cost $300,000. The Colgate University, Hamilton, N. Y., will erect a chemistry building to cost $400,000. The American Can Company, New York, plans a factory branch, storage and distributing plant at Seattle, Wash., to cost $750,000. The American Austin Automobile Company, New York, will establish a plant at Butler, Pa., to cost $300,000. The Niagara Falls Motoramp Garage Company, Niagara Falls, N. Y., plans a service, repair and garage building to cost $300,000. East Orange, N. J., plans extensions in its traffic lighting system to cost $33,000. The Ballwood Company, Passaic, N. J., will build an addition to its pipe manufacturing plant to cost $70,000. The Philadelphia & Reading Railway Company, Philadelphia, plans a lumber handling and terminal plant at Port Richmond, N. Y., to cost $250,000. Mapletown, Pa., will soon take bids for a vocational school to cost $35,000. The Sinclair Refining Company, New York, plans an addition to its oil refining plant at Marcus Hook, Pa., to cost $250,000. The Department of Property and Supplies, Harrisburg, Pa., will receive bids until June 25 for electric elevators and other electrical work for the proposed South Office Building No. 2, Capitol Park. The Department of City Transit, Philadelphia, will build a power substation, to cost $90,000. The Somerset Electric Company, Salisbury, Md., plans a 13-mile transmission line in Wicomico County, with substation facilities. The Curtiss-Caproni Corporation, New York, plans an aircraft plant at Baltimore, Md., to cost $750,000. Pierson & Wilson, Washington, architects, will take bids for a power plant for service at the Capitol, to cost $65,000.

Substation Materials Dominate in St. Louis Market

In the territory surrounding St. Louis, public utilities are buying pole line and substation construction materials in good quantity but there are almost no building materials being moved on account of labor conditions. The demand for appliances continues slightly above normal. One of the large steel companies bought an 800-hp. induction motor for driving a main roll to cost $9,000. A synchronous motor-generator set of 300 hp. costing $8,000 was bought by an ammunition company. A Western mining company purchased a 400-hp. flywheel type motor-generator set for $3,500 and a switchboard for $9,000. One of the large distributing companies contracted for two frequency changers of 20,000 kw. each with Schervius control to cost $600,000. Construction projects are as follows:

The Beacon Airways of America, Inc., Kansas City, Mo., plans an aircraft plant to cost $100,000. The Butler Aircraft Corporation, Kansas City, Mo., plans an aircraft manufacturing plant to cost $100,000. The Nodaway Milk Products Company, Maryville, Mo., plans a powdered milk plant to cost $200,000. The Union Electric Light & Power Company, St. Louis, plans an addition to its power substation to cost $90,000. Swift & Company, Chicago, contemplates a meat packing plant addition at Tulsa, Okla., to cost $100,000. Fort Worth, Tex., plans a floodlighting system and beacon lamps at the proposed municipal airport to cost $400,000. The West Texas Utilities Company, Abilene, Tex., plans transmission line to Santa Anna, Cross Plains, Tex., and vicinity, about 30 miles and will build a substation at the last noted place.

Strong Demand for Pumping Motors on Pacific Coast

Power company purchases, especially of pole-line hardware, transformers and special wires, feature local buying on the Pacific Coast, four carloads of hardware, 500 assorted distribution transformers, sizes 5 to 100 kva., though principally small, and about $20,000 worth of lead and varnished cambric wires being reported. Pumping motors are in big demand and coast factories and assembling plants are running 24-hour shifts for them. A Pomona pumping plant manufacturer purchased $35,000 worth of rotors and stators. New natural gas permits are being sought for Central Valley distribution from the Kettleman fields, which means about $50,000 more of electrical welding machinery for pipe laying. Oil company purchases are improving due to the effect of conservation and gasoline price measures and excellent July and August business is predicted. A Texas company is constructing a million dollar tank farm near Santa Ana, Calif. A San Francisco ferry tower is to be floodlighted, the General Electric Company reporting an order for nine metal-clad switching equipments, six of 2,000 amp. and nine of 600 amp., valued at $60,000. Another General Electric order covers three voltage regulators of 132 kva. valued at $15,000 also for a San Francisco installation. Government projects include a $15,000 contract for a 3-mile, 4,000-volt power line for a $5,000,000 naval munition plant at Hawthorne, Nev., a receiving radio station for Point Loma near San Diego, Calif., and motors and wiring material for San Francisco. Westinghouse reports a $45,000 order for trunk type switching equipment for a Bay district installation, two battery type locomotives valued at $15,000 for the Cushman tunnel, a $15,000 supervising and control equipment for Los Angeles and $15,000 worth of distribution transformers for Boise, Idaho.

Last week's motor business involving machines from 1 hp. to 25 hp. many of them single phase from one to tens by far exceeded any week during May in the Puget Sound district. One jobber alone reported 40 machines, principally to dealers, and another about 30 to dealers, mills and paper plants. Another reported one 150, two 50, one 46, twenty 5-hp. and a number of smaller motors for a sawmill. The Puget Sound Power & Light Company bought two switchboards, costing about $40,000 for the Shuffleton steam plant and the Renton, Wash., substation and the sale of about $1,500 worth of switching equipment and motor control to two central stations was reported. Specifications for a transmission line from the Skagit project to Seattle are being written by the Seattle municipal lighting department and bids for materials are expected to be called for by the middle of the summer. The city of Tacoma on June 10 will open bids for approximately $50,000 worth of transformers; $30,000 worth of incandescent lamps and $25,000 worth of meters. The Seattle school district No. 1, opened bids for approximately $40,000 worth of lighting fixtures for 50 grades and six intermediate and high schools. The largest paper mill in state of Washington to be built at Port Angeles is projected by the Zellerbach interests. A $50,000 fruit and vegetable cannery at Gig Harbor, near Tacoma, is planned by the Peninsula Huckleberry Association. Construction projects are as follows:

Berkeley and Riverside, Calif., contemplate ornamental lighting systems.

The Hunt Brothers Packing Company, San Francisco, will build an addition to its food packing plant at Hayward, Calif., to cost $90,000. The Sunset Pacific Oil Company, Los Angeles, plans a gasoline refining plant near Inglewood, Calif., to cost $75,000. The Long Beach Glass Company, Long Beach, Calif., contemplates a plant to cost $400,000. The Procter & Gamble Company, Cincinnati, Ohio, plans a soap-manufacturing plant at Long Beach, Calif., to cost $1,000,000. Oceanside, Calif., will receive bids until June 12 for oil circuit breakers, transformers, switches, etc., for the electrification of its waterworks station. The Pacific Gas & Electric Company, San Francisco, plans extensions in transmission lines at Red Bluff, Calif., and vicinity. The Board of County Supervisors, San Francisco, is considering a fund of $848,000, for extensions in the street-lighting system. The Firestone Tire & Rubber Company, Akron, Ohio, will build an addition to its plant at South Gate, Los Angeles, to cost $2,000,000. The Calumet & Arizona Mining Company, Lowell, Ariz., plans a steam-operated power plant to cost $400,000. The Central Arizona Light & Power Company, Phoenix, Ariz., plans a steam-operated electric power plant to cost $350,000.

Industrial Business Spotty in Middle West

General business in the Middle West section continues on a satisfactory basis. The major activities continue in a favorable position. The iron workers' strike in the Chicago district threatens to curtail building operations. Industrial activity is somewhat spotty with considerable seasonal activity. Car loadings are high and well diversified. Many of the utility companies are in the market for their third quarter requirements of copper bus bar and weather proof wires and cables. Equipment purchasing is somewhat light although purchas-

ing of maintenance material is comparatively heavy. Interesting orders that have been placed include one for a 1,500 kw. 1,500 volt Mercury Arc rectifier, six carloads of weather proof wire and cable and several construction orders aggregating $70,000. Jobbers' sales are comparatively normal. Construction projects are as follows:

The Hamilton Manufacturing Company, Two Rivers, Wis., will build an addition to its turbine house at its printing equipment supply factory, to cost $40,000. The Eureka Vacuum Cleaner Company, Detroit, plans an addition to cost $60,000. The Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., will build an addition to its paper mill to cost $100,000. The Jewell Tea Company, Chicago, has asked for bids for a plant at Barrington, Ill., to cost $1,000,000. The Commonwealth Edison Company, Chicago, will build a substation to cost $100,000. The Stewart-Warner Corporation, Chicago, plans a plant for the manufacture of automobile brakes, etc., to cost $200,000. The Eagle Foundry Company, Belleville, Ill., will build a plant at East St. Louis, Ill., to cost $85,000. Springfield, Ill., plans a power substation to cost $60,000. The Fosdick Ice Cream Company, Crawfordsville, Ind., will build an addition to cost $100,000. The Calumet Millwork Company, Gary, Ind., will build an addition to cost $180,000. The Ford Motor Company, Detroit, will build an addition to its assembling plant at Indianapolis, Ind., to cost $200,000. The Timken Roller Bearing Company, Canton, Ohio, will build an addition to cost $250,000. The Steubling-Cowan Company, Cincinnati, Ohio, plans an addition to its lift-truck manufacturing plant, to cost $150,000. The Cleveland Equipment Works of the General Electric Company, Cleveland, plans additions to cost $60,000. The J. F. Class Health Fume System, Dayton, Ohio, will build an addition to cost $100,000. The Dayton Rubber Manufacturing Company, Dayton, Ohio, plans an addition to cost $135,000. The Thomas & Hockwalt Laboratories, Inc., Dayton, Ohio, plan a plant to cost $140,000. The Patterson Steel Products Company, East Liverpool, Ohio, plans a plant to cost $100,000. The Minnasota Power & Light Company, Duluth, Minn., will make extensions in its street lighting system and the city will soon ask for bids for an ornamental lighting system to cost $35,000. St. Paul, Minn., plans ornamental lighting system. Graettinger, Iowa, contemplates a municipal electric light and power plant, to cost $40,000. Harlan, Iowa, has awarded a contract to the Electric Equipment Company, Des Moines, Iowa, for improvements in its municipal power plant to cost $135,000.

Non-Ferrous Metal Markets Remain Unchanged

Virtually no change is discernible in the non-ferrous metal markets of the last week. Sentiment seems, in general, to be much better and the general consensus of opinion is that major buying movements in most of the more important metals certainly will develop this month.

A slight improvement in foreign demand has resulted from the virtual settlement of the reparations question and the improvement in buying from abroad, in which England has been a dominant factor, has tended to improve sentiment in the trade here. A further bullish item has been the strength of copper shares on the stock exchanges, which is taken to indicate that Wall Street believes present prices will be maintained.

NEW YORK METAL MARKET PRICES

	May 29, 1929 Cents per Pound	June 5, 1929 Cents per Pound
Copper, electrolytic	18	18
Lead, Am. S. & R. price	7.00	7.00
Antimony	8.95	8.875
Nickel, ingot	35	35
Zinc, spot	6.975	7.05
Tin, Straits	43.50	43.50
Aluminum, 99 per cent.	24.30	24.30

Base copper wire price June 5, 1929, 19¾ cents

Activities of the Trade

Westinghouse Changes Pittsburgh Headquarters

The offices of the Westinghouse Electric & Manufacturing Company in Pittsburgh are now established in the Grant Building, J. Andrews, Jr., central district manager of the company has announced. A. W. Robertson, chairman of the board, will have offices in the building. The entire eighteenth floor and half of the nineteenth floor will be occupied. The central district office of the company in Pittsburgh covers territory in West Virginia, Michigan, Ohio, Indiana, Kentucky and Pennsylvania.

Copeland Products Reports Good Quarter

Copeland Products, Inc., Detroit, manufacturer of electric refrigerating systems, reports net earnings of $60,886 for the quarter ended March 31, 1929. The March shipments of electric refrigerating systems showed an increase in dollar volume of more than 40 per cent over March a year ago and the April volume exceeded last April by 52 per cent and was higher by 36 per cent than any previous month in the company's history. Orders received last month indicated another new record. On May 1 the orders received for immediate shipment were more than twice the number of those ever before received in a single day.

Carborundum Company Announces Staff Changes

The Carborundum Company, Niagara Falls, N. Y., manufacturer of abrasive and refractory materials, announces the following changes among the personnel of its sales department: C. J. Steuber has been appointed district sales manager at Detroit with headquarters at 2759 East Grand Boulevard, succeeding Anthony Dobson, who has retired from active business. H. E. Kerwin has been appointed district sales manager at Milwaukee. Robert Rainnie has taken over Mr. Kerwin's old territory in the Chicago district. George Harden has been appointed sales manager for Germany with headquarters at the Deutsche Carborundum Works, Dusseldorf, Germany. Mr. Harden's old territory, Flint, Saginaw and Bay City, Mich., has been taken over by J. C. Gallen, who previously sold Carborundum products in the Lansing and Ann Arbor, Mich., districts with headquarters at Detroit. H. S. Monroe, who formerly represented the company in Detroit, has been appointed to take over Mr. Gallen's old territory and Philip R. Dumas has taken over Mr. Monroe's old territory.

M. J. Lewis Products Office at Philadelphia, Pa.

The address of the M. J. Lewis Products Company, which was incorrectly published in the May 25 issue of the ELECTRICAL WORLD, page 269, as being located at Canton, Ohio, should have been stated as at 723 Chestnut Street, Philadelphia, Pa.

THE CLARK CONTROLLER COMPANY, 1146 East 152d Street, Cleveland, announces that J. J. Mellon, formerly of Pittsburgh, has joined its home office force as sales engineer.

THE GENERAL ELECTRIC COMPANY, has decided to move its meter manufacturing plant from Indiana to Lynn, Mass., according to a statement issued by Mayor Ralph S. Baure of Lynn, Mass.

THE PENNSYLVANIA PUMP & COMPRESSOR COMPANY, Easton, Pa., announces that Wells Fargo & Company, Express, S. A., Apartado Postal, 361, have been appointed its agents for the Republic of Mexico.

THE ILLINOIS ELECTRIC PORCELAIN COMPANY, Macomb, Ill., announces that J. W. Ward, for the past six years, general superintendent of the Porcelain Insulator Corporation of Lima, N. Y., is now associated with its company and will give the company the benefit of his long experience in the manufacture of high-tension insulators.

THE IDEAL COMMUTATOR DRESSER COMPANY, Sycamore, Ill., announces that due to increased business it has been necessary to acquire larger quarters for its branch in New York. The Eastern office and warehouse is now located at 18 Warren Street, New York City, and will be in charge of R. W. Becker, Eastern division manager, and F. J. Dreyfuss, New York district manager.

Electrical Patents

Announced by U. S. Patent Office

(Issued May 21, 1929)

1,714,341. STATION INDICATOR; W. A. Andersen, Jacmel, Haiti. App. filed Nov. 21, 1922.

1,714,385. ELECTRIC SOLDERING IRON; W. L. Lofthouse, Los Angeles, Calif. App. filed Dec. 22, 1927.

1,714,399. ELECTRICAL-FIXTURE CONSTRUCTION; H. D'Olier, Jr., Bridgeport, Conn. App. filed Dec. 8, 1924.

1,714,415. AUTOMATIC CIRCUIT-BREAKING SYSTEM; H. Benit, Paris, France. App. filed Jan. 13, 1927.

1,714,431. SAFETY DASHPOT; O. G. Lissen, Jersey City, N. J. App. filed Sept. 24, 1926.

1,714,449. COMBINED STEAM ELECTRIC DRIVE FOR GENERATOR SETS; R. E. Royse, Tacoma, Wash. App. filed July 5, 1928.

1,714,467. STORAGE-BATTERY GREASE-SEALING NUT; W. E. Dunn, Wilmette, Ill. App. filed Aug. 23, 1923.

1,714,475. SIGNAL FOR CONCRETE MIXERS; G. Jaeger, Columbus, Ohio. App. filed Feb. 4, 1924.

(Issued May 28, 1929)

1,714,518. HOUSING FOR LIGHTING-FIXTURE SUPPORTS; R. V. Owen, St. Louis, Mo. App. filed July 15, 1925.

1,714,526. TUMBLER SWITCH; R. R. Smith, Jackson Heights, N. Y. App. filed Nov. 3, 1925.

1,714,531. SWITCH; L. J. Voorhees, New York, N. Y. App. filed Feb. 12, 1925.

1,714,552. SPARK-GAP LIGHTNING ARRESTER; E. A. Everett, New York, N. Y. App. filed Aug. 30, 1926.

1,714,571. ELECTROMAGNETIC CONTACT APPARATUS; W. Schaffner, Baden, Switzerland. App. filed March 3, 1926.

1,714,576. ELECTRIC MOTOR CONTROL; W. B. Tunstall and H. H. Wright, Worcester, Mass. App. filed Oct. 26, 1922.

1,714,578. ELECTRIC HEATING APPARATUS; P. F. Weiss, Chicago, Ill. App. filed April 30, 1926.

1,714,590. CONNECTER; C. W. Dake, Chicago, Ill. App. filed Feb. 8, 1926.

1,714,610. EXTENSION PLUG FOR ELECTRIC SOCKETS; C. J. Meder, Philadelphia, Pa. App. filed June 11, 1926.

1,714,615. SOLDERING IRON; P. Naumann, Dresden-Blasewitz, and K. Weber, Dresden, Germany. App. filed Dec. 24, 1927.

1,714,656. ELECTRICAL LOAD-SHARING APPARATUS; W. A. A. Burgess, Monkseaton, and N. Cooke, Sunderland, England. App. filed May 3, 1928.

1,714,662. VARIABLE CONDENSER; W. Dubilier, New York, N. Y. App. filed Sept. 16, 1922.

1,714,675. OVERLOAD-ACTUATED DEVICE; C. G. Koppitz, Greensburg, Pa. App. filed Jan. 13, 1926.

1,714,680. SWITCH; M. M. Levinson, Altadena, Calif. App. filed March 26, 1924.

1,714,683. ELECTRICAL INSULATION; H. H. Lowry, Mountain Lakes, N. J. App. filed Aug. 26, 1927.

1,714,690. VALVE; C. A. Nevins, New York, N. Y. App. filed July 1, 1926.

1,714,716. COVERED MULTIPLE-STRAND ELECTRICAL CONDUCTOR AND METHOD OF FORMING THE SAME; J. H. Hunter, Detroit, Mich. App. filed Nov. 22, 1926.

1,714,722. ELECTRICAL DISTRBUTION SYSTEM; C. McL. Moss, Pittsburgh, Pa. App. filed Jan. 16, 1924.

1,714,743. CAM-ACTUATED CONTACT-LEVER MECHANISM; E. R. Vontobel, Oerlikon, Switzerland. App. filed April 7, 1928.

1,714,762. BATTERY TERMINAL CONNECTER; J. W. Bone, Omaha, Neb. App. filed Feb. 3, 1928.

1,714,763. CONNECTING PLUG; W. T. Boyson, Philadelphia, Pa. App. filed July 23, 1928.

1,714,790. FUSE BLOCK; F. T. Kovar, Cleveland, Ohio. App. filed Sept. 13, 1924.

1,714,866. FUSE BOX; E. B. Green, Washington, D. C. App. filed Jan. 27, 1928.

1,714,867. WELDING APPARATUS; A. R. Gross, St. Paul, Minn. App. filed July 2, 1927.

1,714,883. GENERATOR VOLTAGE REGULATOR; J. E. Love, Schenectady, N. Y. App. filed Dec. 12, 1925.

1,714,937. SAFETY SIGNAL FOR ELECTRIC FLATIRONS; O. Anderson, Portland, Ore. App. filed June 27, 1928.

1,714,938. AUTOMATIC SWITCHING EQUIPMENT; R. E. Bear, Los Angeles, Calif. App. filed April 28, 1928.

1,714,940. PROTECTIVE APPARATUS; J. Biermanns, Karlshorst, Germany. App. filed Feb. 28, 1928.

1,714,944. STARTER CONTROL MECHANISM FOR GAS ENGINES; S. J. Boughton, Toledo, Ohio. App. filed July 3, 1924.

1,714,962. MEANS FOR REGULATING SECONDARY CURRENT AND VOLTAGE IN TRANSFORMERS; G. A. Thornton, Schenectady, N. Y. App. filed March 12, 1927.

1,714,966 and 1,714,967. SUPERVISORY CONTROL SYSTEM; R. J. Wensley, Edgewood, T. U. White, Pittsburgh, and J. E. Gardner, Wilkinsburg, Pa. Apps. filed Feb. 1 and April 8, 1924.

1,714,968, 1,714,969 and 1,714,970. SUPERVISORY CONTROL SYSTEM; T. U. White, Pittsburgh, Pa. Apps. filed March 17 and April 8, 1924.

1,714,917, 1,714,972 and 1,714,973. SIGNALING SYSTEM; T. U. White, Pittsburgh, and J. E. Gardner, Wilkinsburg, Pa. Apps. filed Nov. 15, Dec. 4, 1924, and Jan. 24, 1925.

1,714,974. ELECTRICAL CONTROL SYSTEM; T. U. White, Pittsburgh, Pa. App. filed Feb. 3, 1925.

1,714,983. AUTOMATIC ELECTROMAGNETIC CIRCUIT BREAKER; W. Klement, Neu-Finkenkrug, near Spandau, Germany. App. filed April 6, 1926.

1,715,017. ELECTRIC WELDING APPARATUS; G. A. Thornton, Schenectady, N. Y. App. filed March 12, 1927.

1,715,018. ELECTRIC HEATING MEANS; R. Von Brockdorff, Munich, Germany. App. filed May 17, 1928.

1,715,035. APPARATUS FOR MANUFACTURING ELECTRICAL CONDENSERS; R. H. Hoyt, Roslindale, Mass. App. filed Dec. 21, 1927.

1,715,067. SELECTIVE-CIRCUIT-CONTROLLING SYSTEM; B. W. Jones, Schenectady, N. Y. App. filed April 12, 1924.

1,715,073. ELECTRIC-WIRE SERVICE BOX; W. T. Ohman, Great Kills, N. Y. App. filed July 20, 1926.

1,715,108. ELECTRIC SWITCH; G. B. Wadsworth, Covington, Ky. App. filed March 23, 1922.

1,715,109. ELECTRIC HEATER; J. A. Williams and E. LeQuornik, Richmond Hill, N. Y. App. filed July 22, 1927.

1,715,172. ELECTRIC FLASHING DEVICE; R. E. Ollerenshaw, London, England. App. filed Jan. 5, 1925.

1,715,190. RAIL BOND; D. L. Crawford, Oakmont, Pa. App. filed April 7, 1926.

1,715,215. MEANS FOR REGULATING THE VOLTAGE OF ELECTRICAL TRANSFORMERS; A. C. Whish, Hayes, England. App. filed Oct. 15, 1928.

1,715,222. SWITCH PLATE; N. Chesler, Brooklyn, N. Y. App. filed Dec. 8, 1927.

1,715,249. SPARK INDICATOR; H. Rue, Long Beach, Calif. App. filed May 24, 1926.

1,715,265. SIGNALING DEVICE; J. B. Archibald, Cedar Rapids, Ia. App. filed April 30, 1923.

1,715,272. ARC LAMP; H. L. M. J. Bénard, Paris, France. App. filed Dec. 17, 1927.

1,715,288. ELECTRIC ACCUMULATING RANGE; M. Hedlund, Stockholm, Sweden. App. filed Nov. 27, 1926.

1,715,311. MULTISTEP REPEATER MOTOR; E. A. Sperry, Jr., Brooklyn, N. Y. App. filed Sept. 29, 1922.

1,715,319. ADJUSTABLE ELECTRICAL CONDENSER; H. W. Houck, East Orange, N. J. App. filed Oct. 7, 1924.

1,715,339. ELECTRIC SWITCHING DEVICE; J. A. Widmer, Detroit, Mich. App. filed Oct. 7, 1921.

New Trade Literature

METERS. — The Cochrane Corporation, Seventeenth Street and Allegheny Avenue, Philadelphia, is distributing bulletin No. 679-A, in which it describes and illustrates its improved V-notch recorder and V-notch meters devoted to the heating, deaerating, softening, filtering and metering of water, the measuring of steam and the profitable utilization of low pressure steam, etc.

PANELBOARDS. — The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is distributing catalog No. 224 describing its new line of panelboards, with photographs and dimension drawings to illustrate each type. The new type NAB Nofuz panelboard using the 15-amp. "Deion" principle circuit breaker is described, as well as the safety type metering panelboards and distribution panelboards. The catalog also shows switchboards and theater switchboards of the most recent type and contains price lists, wire tables and wiring data for motors.

CIRCUIT BREAKERS.—Supplement No. 1-A to bulletin No. 580 issued by the Roller-Smith Company, 233 Broadway, New York City, covers some recent additions to the line of type EAF, small, inclosed circuit breakers.

VALVES, OILERS, ETC.—Bulletin No. 16 issued by W. W. Nugent & Company, 410 North Hermitage Avenue, Chicago, covers its sight feed valves, sight feed oilers, capillary oilers, sight flows, flow alarms, non-flow alarms, oil cups, etc.

SWITCHGEAR. — The Allis - Chalmers Manufacturing Company, Milwaukee, is distributing bulletin No. 1145 describing the Allis-Chalmers "Reyrolle" armor-clad switchgear for power stations, substations and general industrial purposes. Illustrations showing the various types of switchgear units, wiring diagrams and a few installation views are included.

ORNAMENTAL LUMINAIRES. — The Holophane Company, Inc., 342 Madison Avenue, New York City, has issued booklet No. 900, which contains illustrations of its ornamental luminaires for installation in various departments such as shops and stores, showrooms, schools, club buildings, churches, banks, office buildings and for general commercial use.

COMMERCIAL LIGHTING FIXTURES. —The Beardslee Chandelier Manufacturing Company, 216 South Jefferson Street, Chicago, issues catalog No. 44 showing units for commercial lighting suitable for stores, offices, etc. It also contains prices and lighting tables which enable one to calculate the number of units required to illuminate a given area, wattage of the lamps that should be used, etc.

Foreign Trade Opportunities

Following are listed opportunities to enter foreign markets. Where the item is numbered, further information can be obtained from the Bureau of Foreign and Domestic Commerce, Washington, by mentioning the number;

An agency is desired in Paris, France (No. 38,753), for storage batteries and electrical supplies.

Purchase is desired in Rome, Italy (No. 38,746), of electric hair clippers.

An agency is desired in Sydney, Australia (No. 38,778), for medium and low priced electric clocks and electric floor polishing machines.

An agency is desired in Oslo, Norway (No. 38,692), for electric coffee mills.

A sole agency is desired in Sydney, Australia (No. 38,777), for electrical appliances.

An agency is desired in Bombay, India (No. 38,739), for flash lights and batteries.

An agency is desired in Lourenco Marques, Portuguese East Africa (No. 38,713), for household electrical appliances.

An agency is desired in Montreal, Canada (No. 38,775), for household electrical appliances and another (No. 38,784), for wiring supplies and lighting fixtures.

Purchase is desired in Addis Ababa, Ethiopia (No. 38,776), of street lighting equipment.

An agency is desired in Vancouver, Canada (No. 38,700), for electric locomotives for mines.

Purchase is desired in Winnipeg, Canada (No. 38,806), of electric phonograph motors.

An agency is desired in Saskatchewan, Canada (No. 38,712), for brass shell sockets.

Purchase and agency are desired in Copenhagen, Denmark (No. 38,698), for enameled wire.

Purchase is desired in Melbourne, Australia (No. 38,824), of copper and cadmium telegraph wire.